Acorn West 2
2021

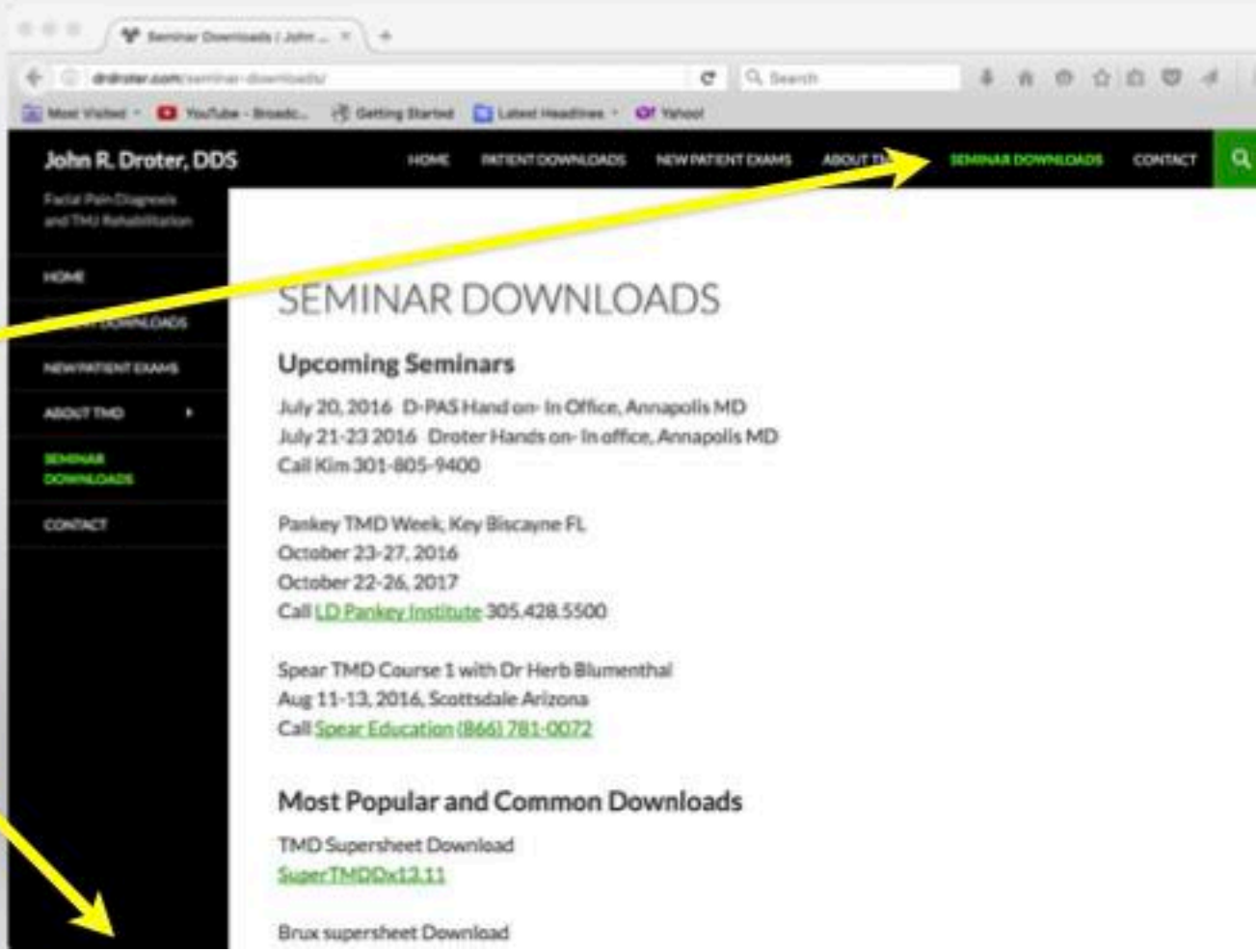
John R Droter DDS
Annapolis, Maryland

John R Droter, DDS

To get todays lecture slides:
go to www.jrdroter.com

Seminar Download

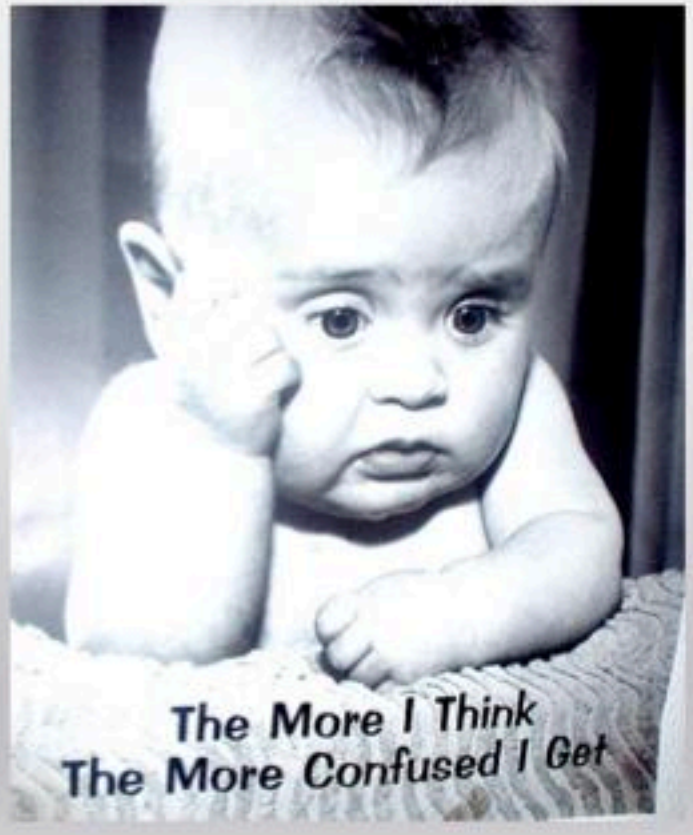
Acorn



Why is TMD So Confusing?

John R Droter DDS
Annapolis, Maryland

TMJ/TMD Confusion



Dogmatic Arguments

Why Confusion?

TMD/TMJ
Symptoms based

Not One Disease

Temporomandibular Disorders (TMD) is an umbrella term covering any condition causing pain or dysfunction in the temporomandibular joint, muscles of mastication, trigeminal nerve, facial nerve, and associated head and neck musculoskeletal and neural structures.
Craniomandibular Disorders would be a better term (CMD).

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ
Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasm of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthrosis- Inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Sero Negative TMJ

2. Muscles of the TMJ

Dystonia
Habitual posture forward mandible
Hemifacial Muscle spasm
Inhibitory Reflex Dysfunction, Periodontal Ligament Masseter Muscle
Muscle Atrophy, TMJ
Muscle Bracing Neck Stabilization
Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway **Patency** (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Iatrogenic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion MaxIC discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified
Malposition /Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Craniocervical Syndrome
Muscle Guarding due Neck Instability
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Excessive Tooth Wear, Damage
Hypersensitive Occlusion
Parafunctional Clenching Teeth, Awake
Parafunctional Clenching Teeth, Sleep
Parafunctional Grinding Teeth, Awake
Parafunctional Grinding Teeth, Sleep
Parafunctional Clench/Grind Wiggle
Parafunctional Tongue Bracing avoiding uncomfortable tooth contact
Parafunctional Tongue Bracing Neck stabilization
Parafunctional Tongue Bracing to maintain Airway
Parafunctional Tongue Bracing unknown cause

6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Disharmony Standing
Postural Disharmony Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neuroma Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors. Somatoform pain disorder
Pain disorder with related psychological factors
Peripheral Sensitization

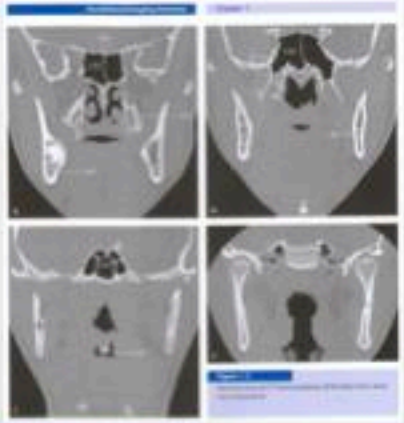
1. TMD: TMJ Damage and Diseases

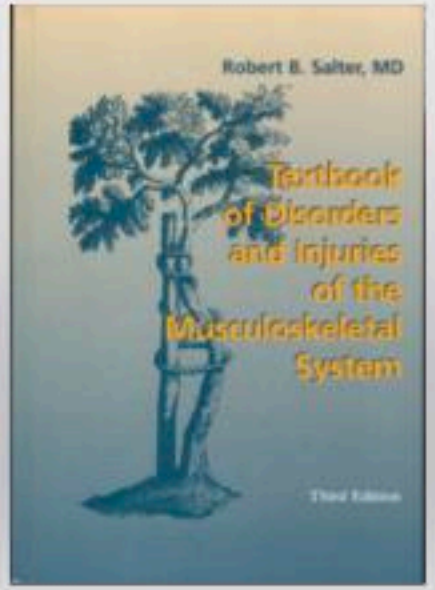
Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to Injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ
Fracture of subcondylar process of mandible
Gout, TMJ
Growth Disturbance Prepuberty due to TMJ damage
Hemarthrosis TMJ, Traumatic
Hyperplasia Mandibular Condyle,
Hypoplasia Mandibular Condyle
Hypoxia Reperfusion Injury, TMJ Cartilage Damage
Hypoxic Progressive Condylar Resorption
Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasm of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthrosis- Inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Sero Negative TMJ
Rheumatoid Arthritis TMJ
Sprain Discal Ligament TMJ, acute with joint edema
Subluxation on Loading, TMJ
Subluxation on Movement, TMJ
Synovial Cyst (Ganglion Cyst)
Synovial Hyperplasia
Synovitis

My Core Belief

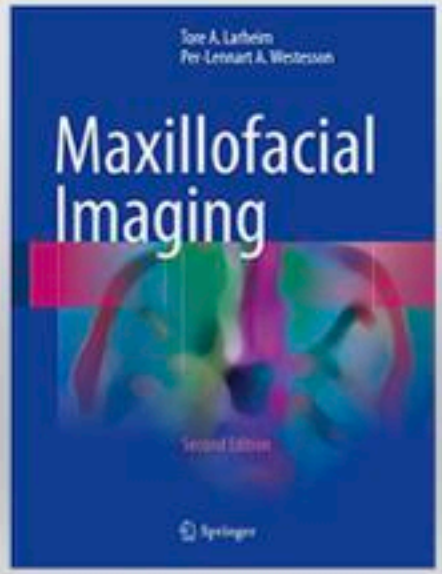
The TMJ is a synovial joint of the human body and will undergo the same disease processes as any other synovial joint

Understanding orthopedic medicine is the key to understanding joints, including the TMJ





Buy Salter's Orthopedic Textbook.
When you have a patient with specific disease (i.e. osteoarthritis), read that chapter.



Textbook of Disorders and Injuries of the Musculoskeletal System
Robert Salter MD

Maxillofacial Imaging
Larheim
Westesson

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ
Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasm of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthrosis- Inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Sero Negative TMJ

2. Muscles of the TMJ

Dystonia
Habitual posture forward mandible
Hemifacial Muscle spasm
Inhibitory Reflex Dysfunction, Periodontal Ligament Masseter Muscle
Muscle Atrophy, TMJ
Muscle Bracing Neck Stabilization
Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway **Patency** (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Iatrogenic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion MaxIC discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified
Malposition /Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Craniocervical Syndrome
Muscle Guarding due Neck Instability
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Excessive Tooth Wear, Damage
Hypersensitive Occlusion
Parafunctional Clenching Teeth, Awake
Parafunctional Clenching Teeth, Sleep
Parafunctional Grinding Teeth, Awake
Parafunctional Grinding Teeth, Sleep
Parafunctional Clench/Grind Wiggle
Parafunctional Tongue Bracing avoiding uncomfortable tooth contact
Parafunctional Tongue Bracing Neck stabilization
Parafunctional Tongue Bracing to maintain Airway
Parafunctional Tongue Bracing unknown cause

6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Disharmony Standing
Postural Disharmony Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neuroma Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors. Somatoform pain disorder
Pain disorder with related psychological factors
Peripheral Sensitization

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with DTR, TekScan
Condylar distraction

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed
Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

Different Diagnoses have Different Therapies

Specific Diagnosis

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage
2. Muscles of the TMJ
3. Cranial Alignment/Occlusion
4. Cervical Damage
5. Parafunction
6. Whole Body / Systemic
7. Other

Specific Therapy

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonal
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Condylar distraction
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with OTR, TekScan

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Diagnostic Palatal Anterior Stop
Brux Checker
Lower full coverage CR
BiArch Posterior Deprogrammer
Upper full coverage hard CR guard
Temporary home use anterior stop
Myobrace
Aqualizer
Lower Soft Sectional
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower postured indexed
Lower CR Indexed
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

70

Facial Pain Diagnosis

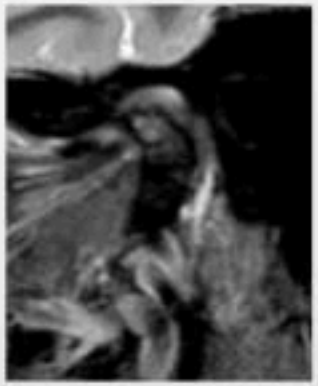
Diagnostic Tools

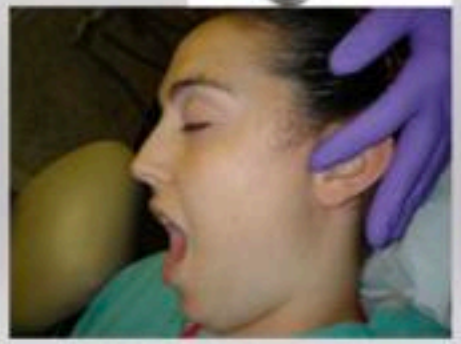
1 Written and Oral History
2 Observation
3 Physical Exam
- Muscle Palpation
- Joint Palpation
- Joint Auscultation
- Joint Motion

4 Anterior Stop Test
5 Sleep Airway Screening
6 CT Scan
- MRI
- Blood Tests

Occlusion: CR Mounted Study Models
Complete Dental Exam
Clinical Photographs
Dx Blocks
Dx Orthotics- Brux Checker, CR Orthotic

<u>Biometrics</u>
Joint Vibration
Jaw Tracker
Electromyography
T-Scan





The Diagnostic Process

When diagnosing and treating facial pain,
we have entered the world of medicine.

Think!!

Differential Diagnosis
All the choices

Diagnostic tests (Observations)
Narrow down the choices

Working Diagnosis
Treating as if

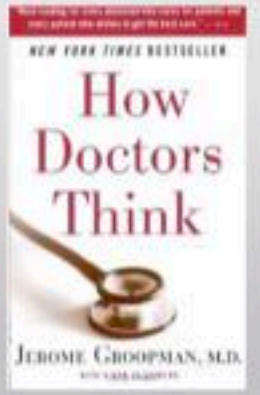
Not completely resolved

Final Diagnosis
Only after problem resolved

Always make a differential diagnostic list
Ask, " It appears to be this, but what else could it be?
Be aware you are blinded by your beliefs

Differential Diagnosis
Diagnostic Boxes: Pattern Recognition

"My Tooth Hurts"



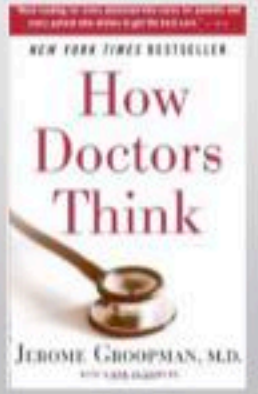
Differential Diagnosis
Diagnostic Boxes: Pattern Recognition

"My Tooth Hurts"

- Reversible Pulpitis secondary to caries
- Irreversible Pulpitis secondary to caries
- Pulpitis secondary to split tooth
- Pulpal necrosis
- Referred Pain from Muscle Trigger Point
- Sinus Infection
- Sympathetic Mediated Pain
- Neuroma

- Periodontal Infection
- Inflamed Tissue secondary to popcorn husk
- Aphthous Ulcer

- Periodontal ligament inflammation secondary to Occlusal Trauma
- Pulpits secondary to Occlusal Trauma
- Other

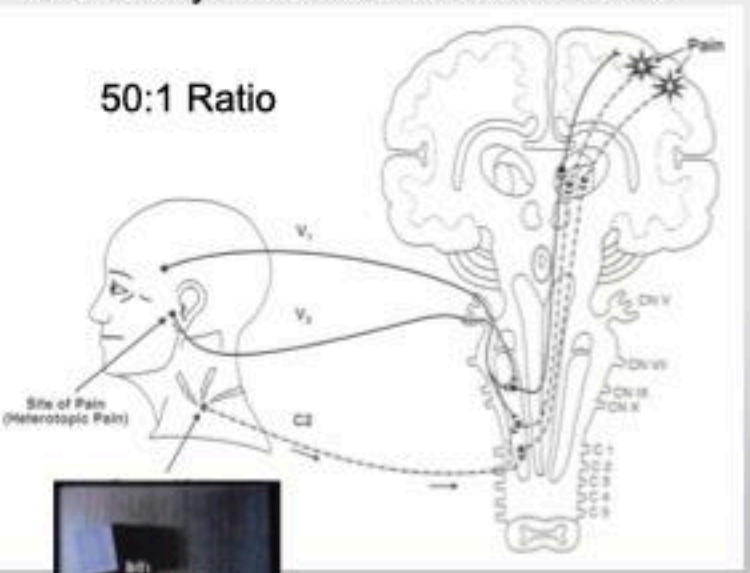


Referred Pain

Convergence

More primary sensory neurons than secondary neurons that travel to brain

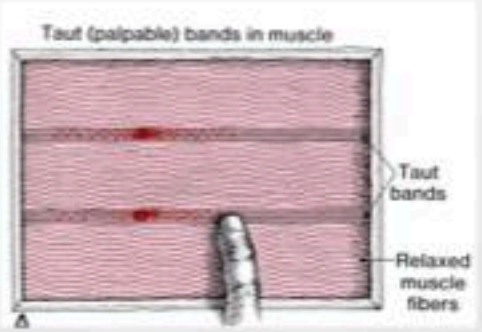
50:1 Ratio

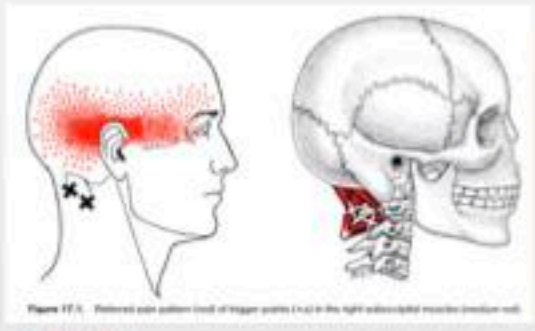


"Bells Orofacial Pain"
Jefery Okeson

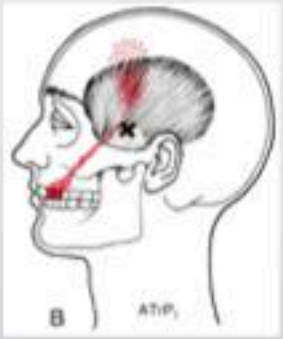
Trigger Points

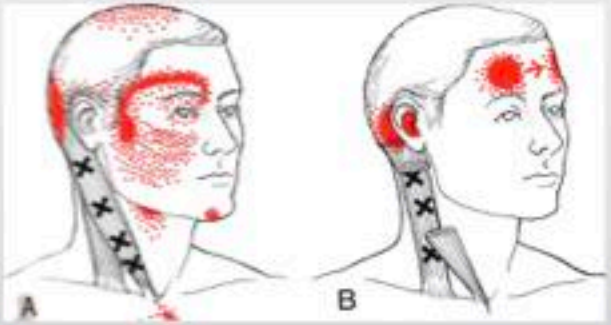
Contracted mass of actin, myosin and histamine

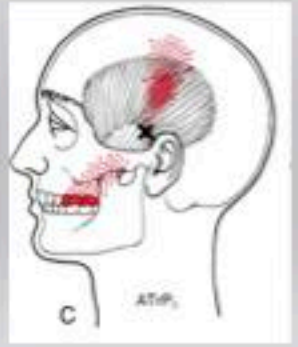


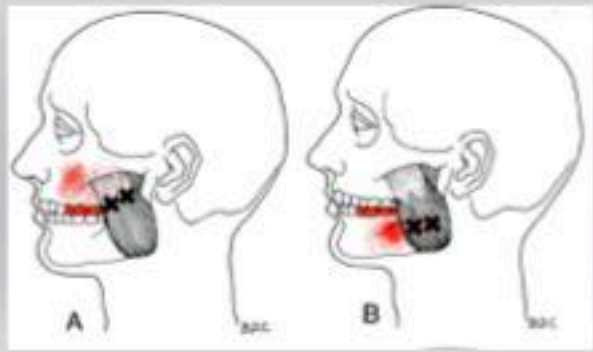


"The Trigger Point Manual"
Janet Travell, MD









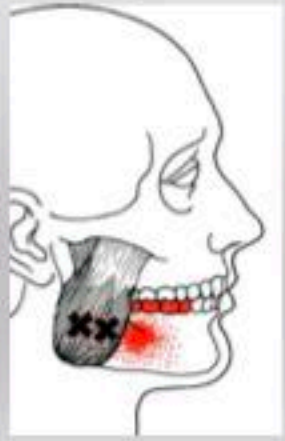
Differential Diagnosis
Diagnostic Boxes: Pattern Recognition

"My Tooth Hurts"

- Reversible Pulpitis secondary to caries
- Irreversible Pulpitis secondary to caries
- Pulpitis secondary to split tooth
- Referred Pain from Muscle Trigger Point

- Periodontal Infection
- Inflamed Tissue secondary to popcorn husk
- Aphthous Ulcer

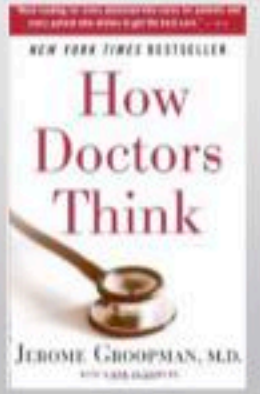
- Periodontal ligament inflammation secondary to Occlusal Trauma
- Pulpits secondary to Occlusal Trauma
- Other



"How Doctors Think", by Jerome E. Groopman

Diagnose by Pattern Recognition
Tendency to make patients fit what we know
Ignore signs and symptoms that do not fit

Always make a differential diagnostic list
Ask, " It appears to be this, but what else could it be?
Be aware you are blinded by your beliefs



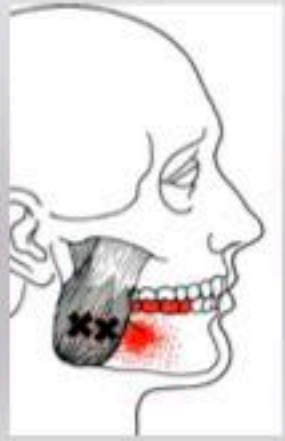
Differential Diagnosis
Diagnostic Boxes: Pattern Recognition

"My Tooth Hurts"

- Reversible Pulpitis secondary to caries
- Irreversible Pulpitis secondary to caries
- Pulpitis secondary to split tooth
- Referred Pain from Muscle Trigger Point

- Periodontal Infection
- Inflamed Tissue secondary to popcorn husk
- Aphthous Ulcer

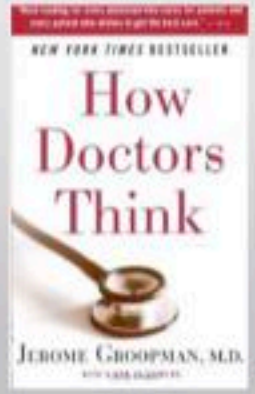
- Periodontal ligament inflammation secondary to Occlusal Trauma
- Pulpits secondary to Occlusal Trauma
- Other



"How Doctors Think", by Jerome E. Groopman

Diagnose by Pattern Recognition
Tendency to make patients fit what we know
Ignore signs and symptoms that do not fit

Always make a differential diagnostic list
Ask, " It appears to be this, but what else could it be?
Be aware you are blinded by your beliefs



The Diagnostic Process

When diagnosing and treating facial pain,
we have entered the world of medicine.

Think!!

Differential Diagnosis
All the choices

Diagnostic tests (Observations)
Narrow down the choices

Working Diagnosis
Treating as if

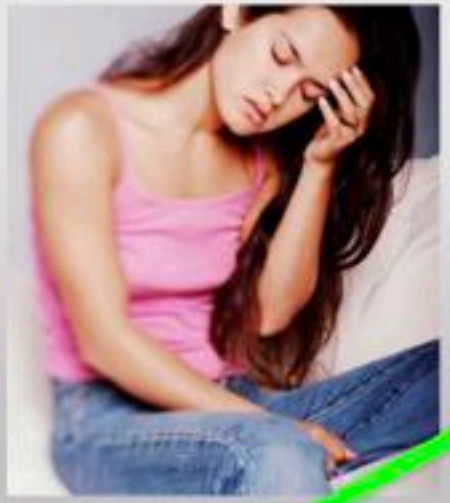
Not completely resolved

Final Diagnosis
Only after problem resolved

Always make a differential diagnostic list
Ask, " It appears to be this, but what else could it be?
Be aware you are blinded by your beliefs

Diagnosis Treatment Flow Chart

From a patient perspective they want to go from symptoms to no symptoms

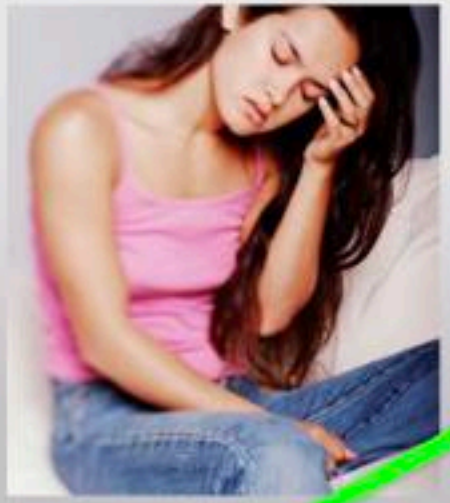


Symptoms

No Symptoms

Diagnosis Treatment Flow Chart

From a patient perspective they want to go from symptoms to no symptoms



Symptoms

History

Signs

Doctor Exam

Differential Diagnosis

Diagnostic Tests

Specific Working Diagnosis

No Signs

No Symptoms
Final Dx

Treatment

Doctor Re-Exam

If not resolved

Symptom Dx		Specific Dx
Tooth Pain	vs	Irreversible Pulpitis
Arthralgia	vs	Osteoarthritis

Facial Pain Diagnosis

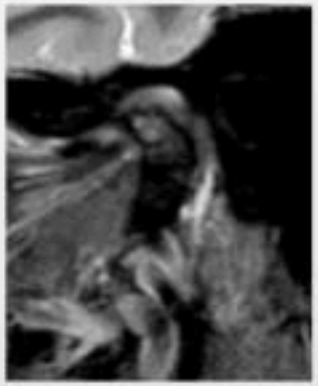
Diagnostic Tools

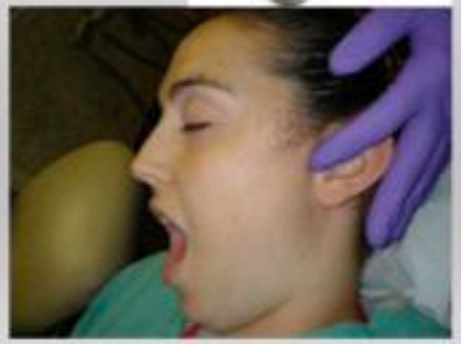
1 Written and Oral History
2 Observation
3 Physical Exam
- Muscle Palpation
- Joint Palpation
- Joint Auscultation
- Joint Motion

4 Anterior Stop Test
5 Sleep Airway Screening
6 CT Scan
- MRI
- Blood Tests

Occlusion: CR Mounted Study Models
Complete Dental Exam
Clinical Photographs
Dx Blocks
Dx Orthotics- Brux Checker, CR Orthotic

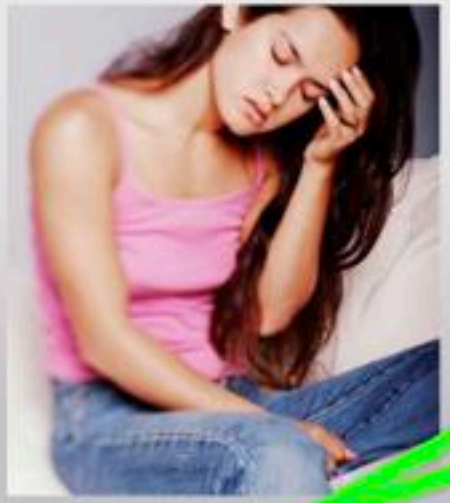
<u>Biometrics</u>
Joint Vibration
Jaw Tracker
Electromyography
T-Scan





Diagnosis Treatment Flow Chart

From a patient perspective they want to go from symptoms to no symptoms



Symptoms

Less Symptoms

No Symptoms

If you skip the exam, diagnostic tests, and diagnosis, you can give a therapy directed at symptoms. If you dull the symptoms the patient will perceive a benefit.

TMD: If only one Diagnosis, only need one Treatment

If only one Treatment, only need one Diagnosis

TMD is a symptom based (generalized) diagnosis

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ
Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasm of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthrosis- Inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Sero Negative TMJ

2. Muscles of the TMJ

Dystonia
Habitual posture forward mandible
Hemifacial Muscle spasm
Inhibitory Reflex Dysfunction, Periodontal Ligament Masseter Muscle
Muscle Atrophy, TMJ
Muscle Bracing Neck Stabilization
Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway **Patency** (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Iatrogenic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion MaxIC discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified
Malposition /Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Craniocervical Syndrome
Muscle Guarding due Neck Instability
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Excessive Tooth Wear, Damage
Hypersensitive Occlusion
Parafunctional Clenching Teeth, Awake
Parafunctional Clenching Teeth, Sleep
Parafunctional Grinding Teeth, Awake
Parafunctional Grinding Teeth, Sleep
Parafunctional Clench/Grind Wiggle
Parafunctional Tongue Bracing avoiding uncomfortable tooth contact
Parafunctional Tongue Bracing Neck stabilization
Parafunctional Tongue Bracing to maintain Airway
Parafunctional Tongue Bracing unknown cause

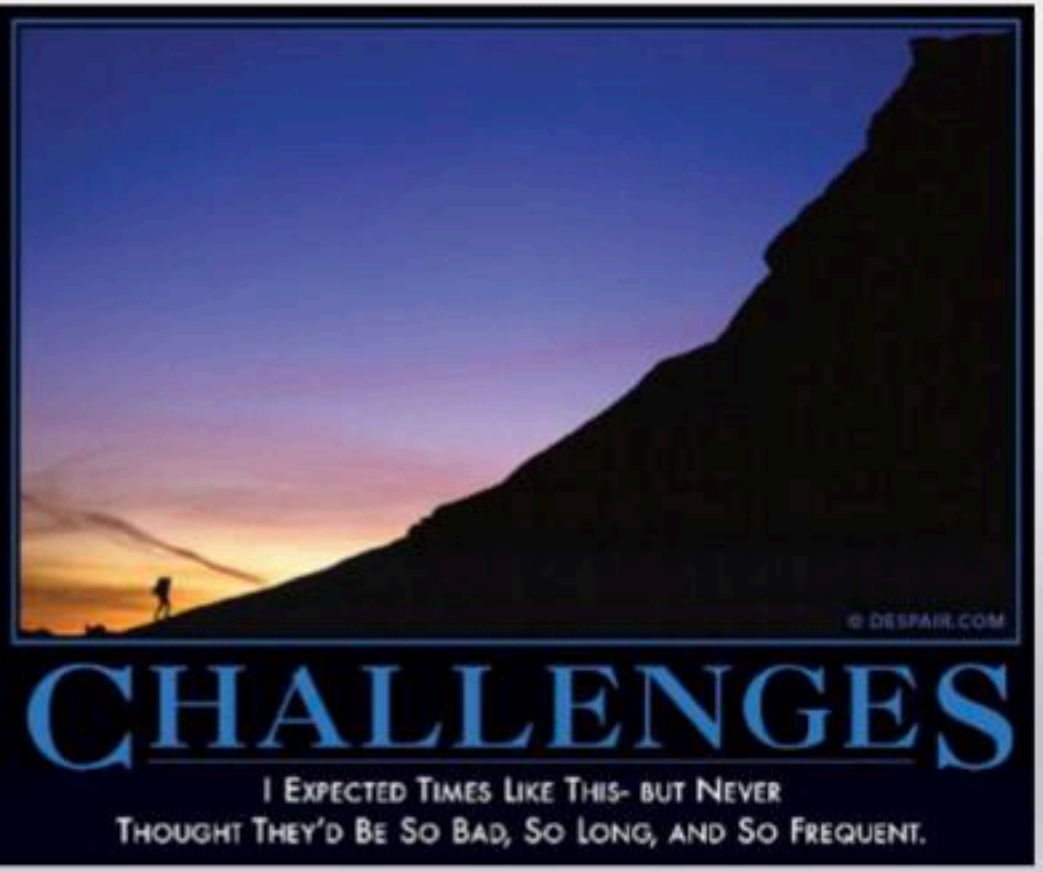
6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Disharmony Standing
Postural Disharmony Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neuroma Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors. Somatoform pain disorder
Pain disorder with related psychological factors
Peripheral Sensitization

TMDs- What are the choices? (190 Diagnoses, 7 Categories)



despair.com

Don't **Despair**, you have choices:

Begin to learn a few new exam skills, a few diagnostic patterns, a few new treatments. Have a box called other.

- Sleep Clenching
- Osteoarthritis
- Acute Sprain of TMJ
- Occlusal Muscle Disharmony
- Upper Airway Resistance
- **Other**

Hello. I am:

John R Droter DDS
Annapolis, Maryland

Milestones

Visiting Faculty Spear Education 2013

Visiting Faculty LD Pankey Institute 2008

Visiting Faculty Orthodontic Program
Washington Hospital Center 2000

On staff AAMC: Orthopedic Rounds
In OR for TMJ Surgery

Devoted Facial Pain Practice 1996
(No Hygiene to Check!!)

CT and MRI Imaging Joints 1992
Guy Haddix, DDS: Mentor
(3,100 images and rising)

Post Grad CE- GPR, LD Pankey Institute, Dawson, Mahan, Gremillion, Spear, Kois

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Condylar distraction
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with DTR, TekScan

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Diagnostic Palatal Anterior Stop
Brux Checker
Lower full coverage CR
BiArch Posterior Deprogrammer
Upper full coverage hard CR guard
Temporary home use anterior stop
Myobrace
Aqualizer
Lower Soft Sectional
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower postured indexed
Lower CR Indexed
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

Different Diagnoses have Different Therapies

Specific Diagnosis

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage
2. Muscles of the TMJ
3. Cranial Alignment/Occlusion
4. Cervical Damage
5. Parafunction
6. Whole Body / Systemic
7. Other

Specific Therapy

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonal
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Condylar distraction
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with OTR, TekScan

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Diagnostic Palatal Anterior Stop
Brux Checker
Lower full coverage CR
BiArch Posterior Deprogrammer
Upper full coverage hard CR guard
Temporary home use anterior stop
Myobrace
Aqualizer
Lower Soft Sectional
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower postured indexed
Lower CR Indexed
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

70

Facial Pain Diagnosis

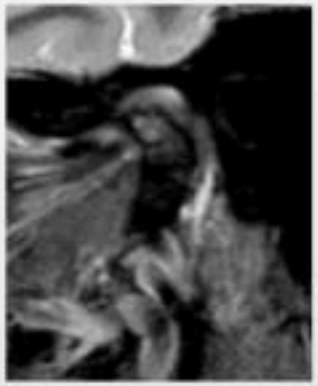
Diagnostic Tools

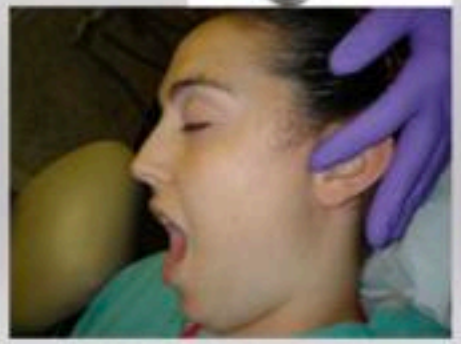
1 Written and Oral History
2 Observation
3 Physical Exam
- Muscle Palpation
- Joint Palpation
- Joint Auscultation
- Joint Motion

4 Anterior Stop Test
5 Sleep Airway Screening
6 CT Scan
- MRI
- Blood Tests

Occlusion: CR Mounted Study Models
Complete Dental Exam
Clinical Photographs
Dx Blocks
Dx Orthotics- Brux Checker, CR Orthotic

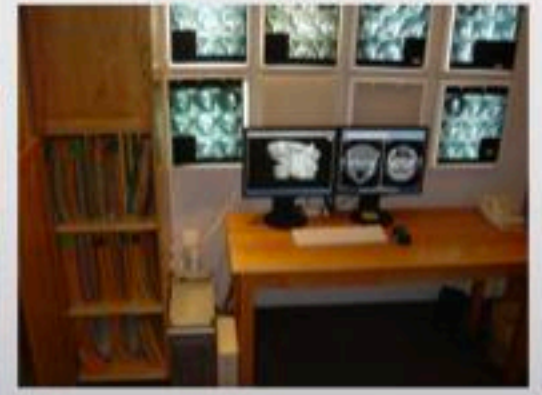
<u>Biometrics</u>
Joint Vibration
Jaw Tracker
Electromyography
T-Scan





Dr Guy Haddix
had been taking CT
scans since 1990

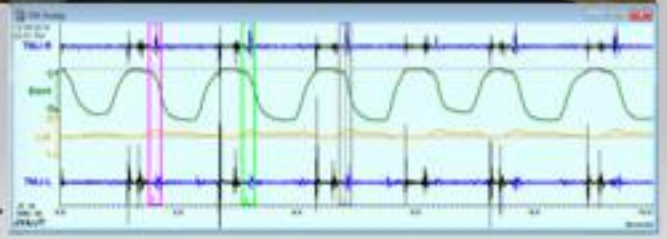
CT and MRI Scans in
my practice since 1992.



Closet full of printed
scans just as digital
appeared!!

Compare CT, Mounted models, MRI,
JVA before and after a case.
What can I see now?

JVA since 2004



Lingual Light Wire- Crozat Arch Expansion

Age 29 Start

7 months LLW Age 30

Anterior Openbite Non Surgical Treatment: Moving the Maxilla

Anterior Openbite with Active TMJ Bone Loss

Non Surgical Therapies

Condylar Distraction

Meloxicam and Doxycycline

Restorative Dentistry

Pathological Occlusion

??Airway Related Bruxing?

Restore Function

Composite Trial Occlusion

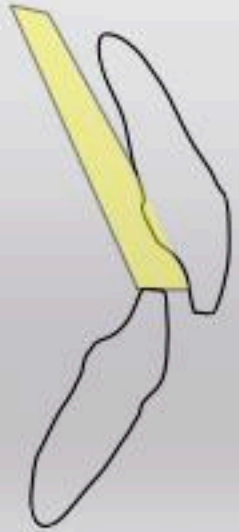
AHI + 26 CPAP

Anterior guidance

or group function?

The D-PAS
Diagnostic Palatal Anterior Stop

Inhibits Sleep Clenching



APS

ArrowPath Sleep

www.APSleep.com
info@apsleep.com

APS In Office Anterior Stop 2.5mm

APS Airway Bite 4mm

APS Home Trial Anterior Stop

APS D-PAS

APS Lat-Brux

Disclosures:

Ski Coach for National Ski Patrol
Level 3 Certified Professional Ski Instructors of America

Atomic Skis- Sponsored.
I do benefit financially.

LD Pankey Institute- I am paid
a small honorarium for lectures

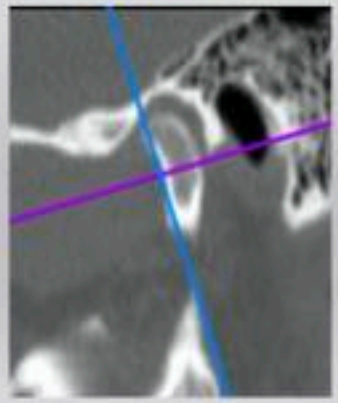
Spear Education- Paid
honorarium for lectures

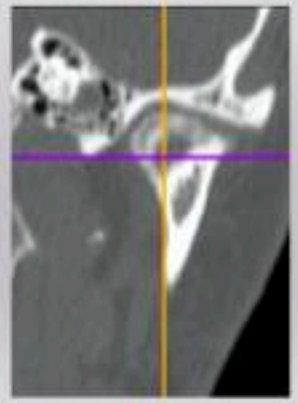
Patent on sleep device: LatBrux
Co-Owner of ArrowPath Sleep

APS
ArrowPath Sleep

All of my slides have been altered with
respect to cropping and exposure.
None have been "photoshopped" to misrepresent reality

I have chosen the most representative slice of and MRI and CT
scans to best represent what you would see if viewing all images





TMD Therapies

John R Droter DDS
Annapolis, Maryland

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage

Adhesions and ankylosis of temporomandibular joint
Avascular Necrosis Mandibular Condyle
Cartilage Fibrillation, Mandibular Condyle, Fossa
Closed Lock, Jaw Cartilage, Acute
Closed Lock, Jaw Cartilage, Chronic
Closed Lock, Jaw Cartilage, Intermittent, Mechanically dysfunctional
Crush Injury Mandibular Condyle
Crystal arthropathy, unspecified, TMJ
Dislocation jaw cartilage due to injury, Sequela
Dislocation jaw cartilage with reduction, favorable adaptation, TMJ
Dislocation jaw cartilage without reduction, favorable adaptation, TMJ
Effusion, TMJ
Impingement Retrodiscal Tissue
Inflammatory Tissue Bone Resorption, TMJ Condyle
Loose Body (Joint Mice), TMJ
Malignant neoplasm of bones of skull and face
Open Lock TMJ, Recurring
Osteoarthritis TMJ, active degeneration
Osteoarthrosis- Inactive
Osteochondritis Dissecans TMJ
Osteolysis Mandibular Condyle, Active
Perforation Meniscus, TMJ
Perforation Pseudodisc, TMJ
Psoriatic Arthritis TMJ
Rheumatoid Arthritis Sero Negative TMJ

2. Muscles of the TMJ

Dystonia
Habitual posture forward mandible
Hemifacial Muscle spasm
Inhibitory Reflex Dysfunction, Periodontal Ligament Masseter Muscle
Muscle Atrophy, TMJ
Muscle Bracing Neck Stabilization
Muscle Bracing Pain Avoidance
Muscle Bracing TMJ stabilization
Muscle Bracing Airway **Patency** (with Tongue)
Muscle Contracture Fibrosis Lateral Pterygoid
Muscle Contracture Fibrosis Masseter, Medial Pterygoid, Temporalis
Muscle Fatigue Overuse
Muscle Hypertrophy TMJ Muscles

3. Cranial Alignment/Occlusion

Cranial Distortion / Misalignment
Hemifacial Hypoplasia
Hyper Occlusal Awareness
Iatrogenic Orthotic Damage
Malocclusion Anterior Open Bite
Malocclusion Centric occlusion MaxIC discrepancy
Malocclusion Deep Bite
Malocclusion due to mouth breathing
Malocclusion due to TMJ bone loss
Malocclusion due to tongue, lip or finger habits
Malocclusion Insufficient anterior occlusal guidance
Malocclusion lack of posterior occlusal support
Malocclusion Posterior Openbite Bilateral
Malocclusion Posterior Openbite Unilateral
Malocclusion unspecified
Malposition /Misalignment: Maxilla, Temporal Bone, Mandible
Mandibular asymmetry
Mandibular hyperplasia
Mandibular hypoplasia
Mandibular Retrognathia
Maxillary asymmetry
Maxillary hyperplasia
Maxillary hypoplasia
Maxillary Retrognathia
Occlusal Adaptation, Favorable
Occlusal Dependency for Joint Stabilization/ Proprioception
Tooth Intrusion
Tooth Supereruption

4. Cervical Damage

Cervical Vertebrae Alignment Dysfunction
Craniocervical Syndrome
Muscle Guarding due Neck Instability
Trigger Point Neck Muscle with Referred Pain
Trigger Point Neck Muscle, Localized Pain

5. Parafunction

Excessive Tooth Wear, Damage
Hypersensitive Occlusion
Parafunctional Clenching Teeth, Awake
Parafunctional Clenching Teeth, Sleep
Parafunctional Grinding Teeth, Awake
Parafunctional Grinding Teeth, Sleep
Parafunctional Clench/Grind Wiggle
Parafunctional Tongue Bracing avoiding uncomfortable tooth contact
Parafunctional Tongue Bracing Neck stabilization
Parafunctional Tongue Bracing to maintain Airway
Parafunctional Tongue Bracing unknown cause

6. Whole Body / Systemic

Lyme Disease Arthritis
Magnesium Deficiency
Obstructive Sleep Apnea
Osteoporosis without current pathological fracture
Pathological Habitual Movement Pattern
Postural Disharmony Standing
Postural Disharmony Walking
Postural Forward Head Position
Upper Airway Resistance, UARS

7. Other

Nerve Entrapment Masseteric Nerve due to Masseteric hypertonicity
Neuroma Trigeminal Nerve
Obsessive-Compulsive Personality Disorder
Other
Otitis Ear Infection
Pain disorder exclusively related to psychological factors. Somatoform pain disorder
Pain disorder with related psychological factors
Peripheral Sensitization

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with DTR, TekScan
Condylar distraction

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed
Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

Different Diagnoses have Different Therapies

Specific Diagnosis

TMDs- What are the choices? (190 Diagnoses, 7 Categories)

1. TMJ Damage
2. Muscles of the TMJ
3. Cranial Alignment/Occlusion
4. Cervical Damage
5. Parafunction
6. Whole Body / Systemic
7. Other

Specific Therapy

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonal
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Condylar distraction
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with OTR, TekScan

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Diagnostic Palatal Anterior Stop
Brux Checker
Lower full coverage CR
BiArch Posterior Deprogrammer
Upper full coverage hard CR guard
Temporary home use anterior stop
Myobrace
Aqualizer
Lower Soft Sectional
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower postured indexed
Lower CR Indexed
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

70

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with DTR, TekScan
Condylar distraction

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed
Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

TMD Therapies

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

TMD Therapies

Physical

Ice
Hot Cold Hot

Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

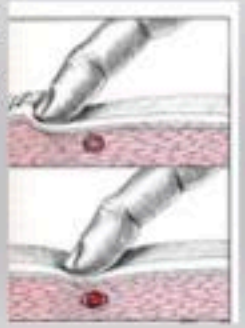
Wet Towel in Microwave
3 Min Hot
3 Min Hot

3 Min Cold

Ice Pack
15 min 3-5x a day

ThermoSafe
U-Tek Cold Pack
-23° C

Triggerpoint
in muscle



TMD Therapies

Physical

Ice
Hot Cold Hot

Cold Laser
TENS in office
TENS home use

Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Breathe, Walk , Exercise

Cold laser for sore joints, inflammation, muscle triggerpoints

3x week for 3 weeks

BioResearch MLS Laser 808, 905 pulsed Diode

Handheld TENS
Acupuncture Pen

BioResearch
QuadraTENS

Past Dry Needling and ischemic Pressure

MLS Laser

Multiwave Locked System Laser

808 nm Continuous, 905 nm Pulsed

Stimulates metabolic processes in cells
Decrease inflammation
Pain Reduction
Faster Healing

Diode Laser

Treatment OA

Osteoarthr**osis**

Minimize parafunction:

If sleep grinding due to airway:

CPAP or Dental Airway Device

Glucosamine 1500mg /Chondroitin 600 mg

Shea Brand CBD

Osteoarthr**itis**

All of the above plus eliminate inflammation……

NSAIDs

Cold Laser

If still inflamed arthrocentesis with Platelet Rich Plasma (PRP)

No Shellfish allergy

MLS Laser

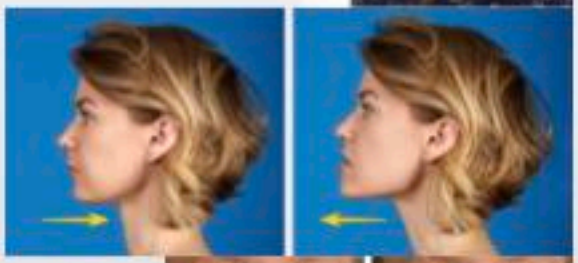
3x week for 3 weeks

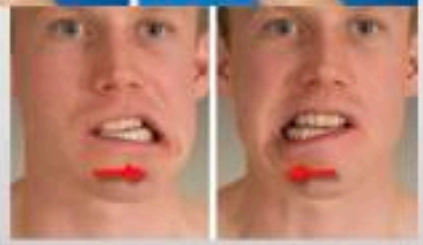
TMD Therapies

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use

20 reps, 5x a day, non painful
Open close, side to side, front to back

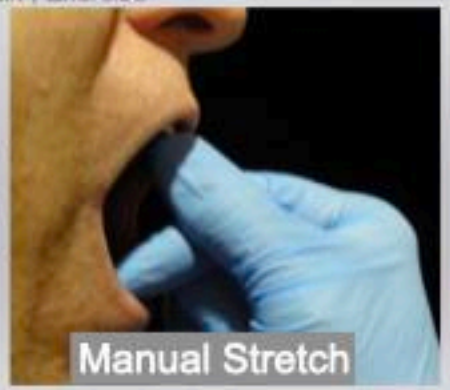




Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint

Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Danger,
Danger,
Danger.



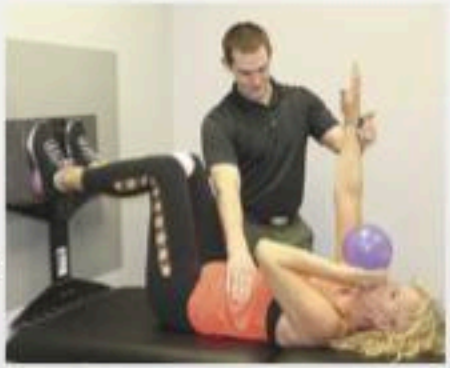
Must have MRI for all active stretches.
You will be irreversibly tearing/stretching ligaments.

TMD Therapies

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint

Postural Restoration Therapy

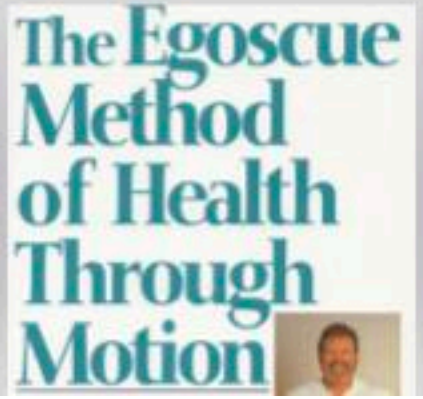


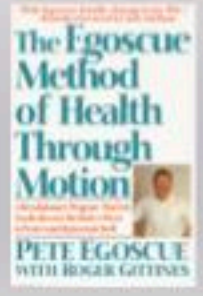
Dr Mariano Rocabado

Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Physical Therapy: Rocabado mobilization

Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

If no access to professionals.
Do it yourself PT.
Strengthen weak opposing muscles





TMD Therapies

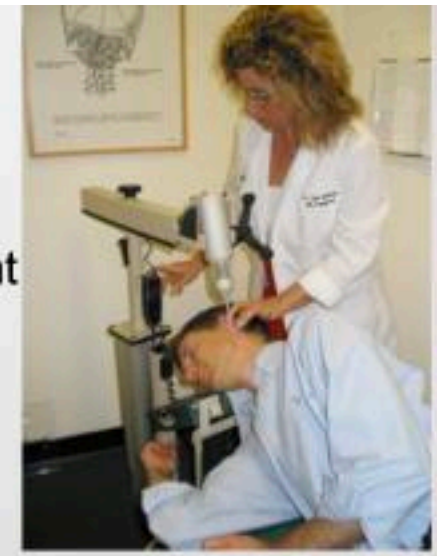
Physical

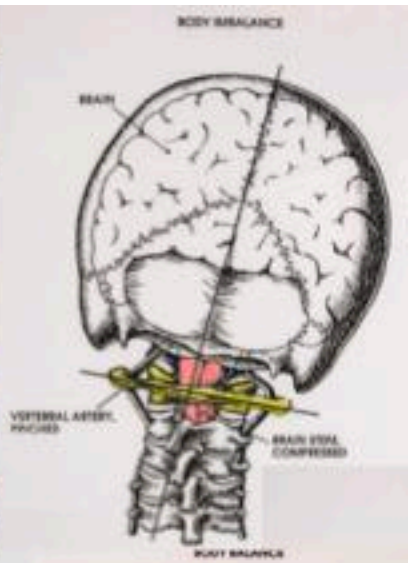
Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies

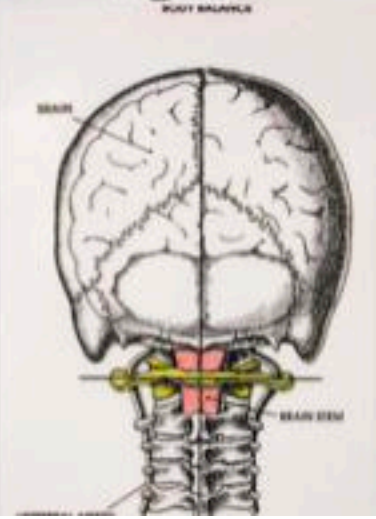
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic DO: Body alignment

Breathe, Walk , Exercise

Atlas
Alignment

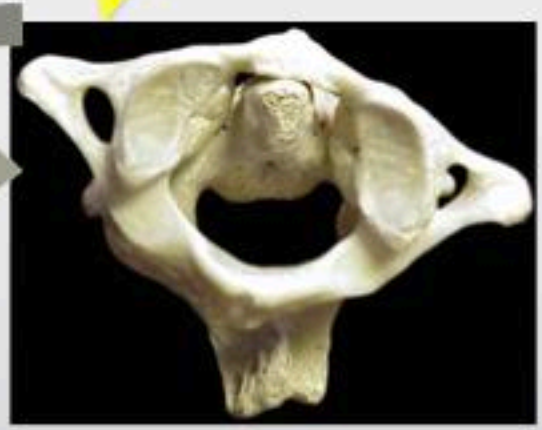


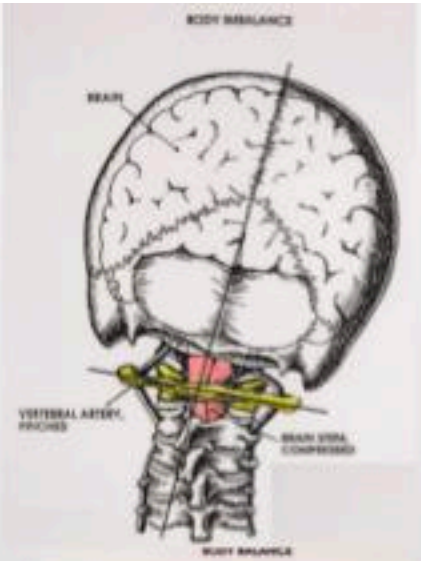


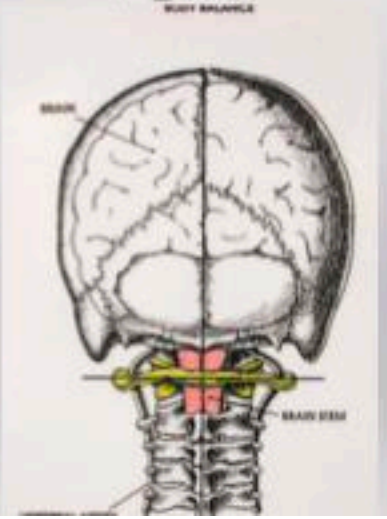


Atlas Orthogonist
Branch of Chiropractic Medcine

Uses sound wave to move atlas,
disrupts muscle bracing







TMD Therapies

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment

Breathe, Walk , Exercise

Postural Restoration PT addresses these

Which famous doctor published this?

A desire to take medicine separates man from animals. Why this appetite should have developed, how it could have grown to its present dimension, what it will ultimately reach, are interesting problems in psychology. We of the profession…..routinely administer nauseous mixtures on every possible occasion.

…..when we are able to say without fear of dismissal, that a little more exercise, a little less food, and a little less tobacco and alcohol may possible meet the indications of the case.

Sir William Osler, 1891

A desire to take medicine separates man from animals. Why this appetite should have developed, how it could have grown to its present dimension, what it will ultimately reach, are interesting problems in psychology. We of the profession…..routinely administer nauseous mixtures on every possible occasion.

…..when we are able to say without fear of dismissal, that a little more exercise, a little less food, and a little less tobacco and alcohol may possible meet the indications of the case.

"Recent Advances in Medicine," Science, March **1891**

Founding father of Johns Hopkins Medical School
Father of modern medicine
"Greatest diagnostician ever to wield a stethoscope"

from book: William Osler, A life in Medicine. Michael Bliss

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with DTR, TekScan
Condylar distraction

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed
Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

Surgical

Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

TMD Therapies: (70 therapies)

Physical

Ice
Hot Cold Hot
Cold Laser
TENS in office
TENS home use
Range of motion exercises
Active Stretching: Manual, Tongue Blades, Dynasplint
Refer to Physical Therapy: Rocabado mobilization
Refer to Physical Therapy: Postural Restoration Therapy
Refer to Physical Therapy: Various Muscle Therapies
Refer to Chiropractic: Atlas Orthogonist
Refer to Osteopathic MD: Body alignment
Breathe, Walk , Exercise

Medicinal

Anti Inflammatory:
NSAIDs,
Doxycycline low dose
CBD Topical
Glucosamine/Chondroitin MSM
Vitamins: Vit C, Vit D, Vit B12
Minerals: Magnesium, Electrolytes
Minerals: Iron
Refer to MD for Lyme therapies
Refer to MD Rheumatoid Arthritis therapies
Refer Botox Masseter injections
Refer Botox Lateral Pterygoid Injections
Food

Occlusal Orthopedic

Lingual Light Wire
Lower soft sectional orthotic
Sectional orthodontics
Expansion orthopedics/ orthodontics
Restorative Dentistry
Occlusal Adjustment with DTR, TekScan
Condylar distraction

Tongue Parafunction

Refer for Cervical Alignment/ Stabilization
Myobrace
Upper Lingual light wire
Clear Brux Checker
Frenectomy
Myofunctional therapy

Dental Orthotics

In Office Trial Anterior Stop
Temporary home use anterior stop
Myobrace
Aqualizer
Diagnostic Palatal Anterior Stop
Lower full coverage CR
Lower posterior deprogrammer
Lower TMJ Rehab flat plane
Lower Indexed
Brux Checker
Upper full coverage hard CR guard
BiArch Posterior Deprogrammer
Mandibular Advancement Device
Lateral Bruxing Device

Sleep/ Fatigue

Mouth taping
Diet Modification
Positional Therapy
Vitamins: Vitamin D, Vitamin B12, Vit C
Minerals: Magnesium, Iron
Lateral Bruxing Device guided plane
Lateral Bruxing Device Elastomeric
Mandibular Advancement Device
CPAP

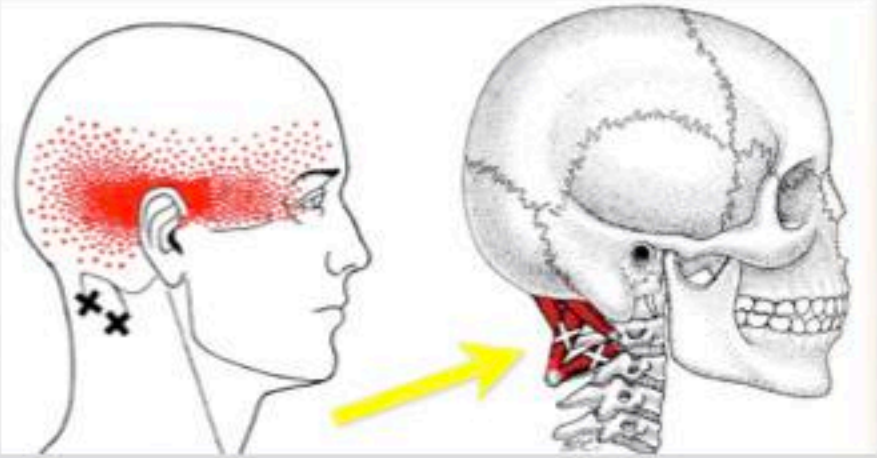
Surgical

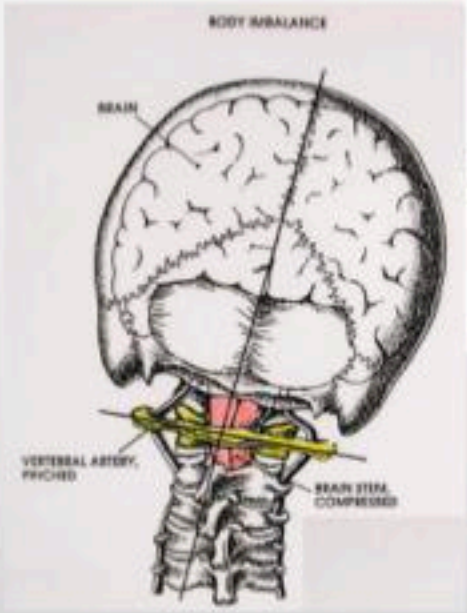
Refer: Arthrocentesis w/ PRP
Refer: Discectomy w/ Fat Graft
Refer: Total Joint Replacement
Refer: Orthognathic Surgery

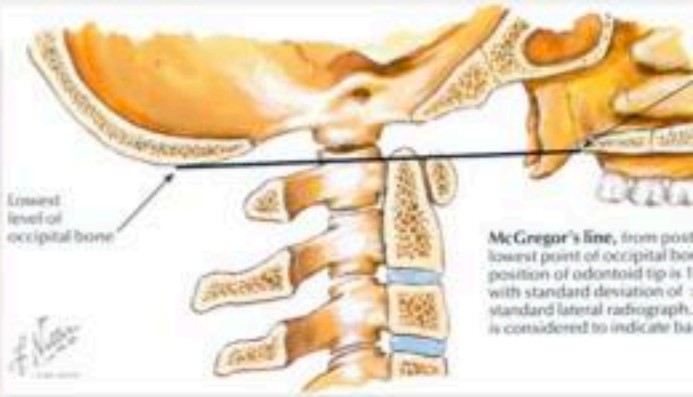
Atlas

John R Droter DDS
Annapolis, Maryland

What is this knot of muscle at base of skull?
Will neck alignment affect jaw alignment?







Skull is 10 lbs supported by occiput on atlas

My observations years ago:

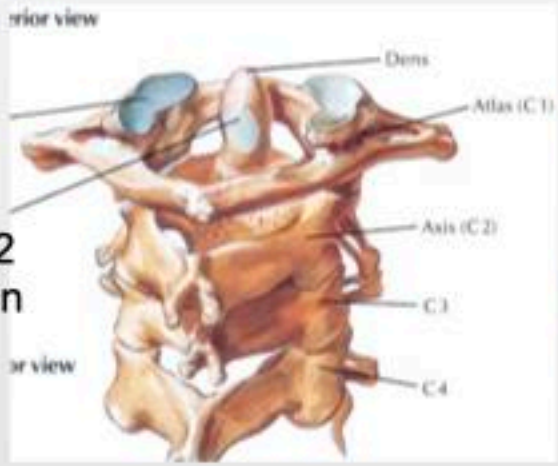
- Could not get rid of the suboccipital knot, no matter what tx.
- While most OMD patients improved with occlusal therapies, some had persisting neck symptoms
- Migraines managed but not eliminated with medication and ideal occlusion
- Suboccipital accupuncture helped some migraines

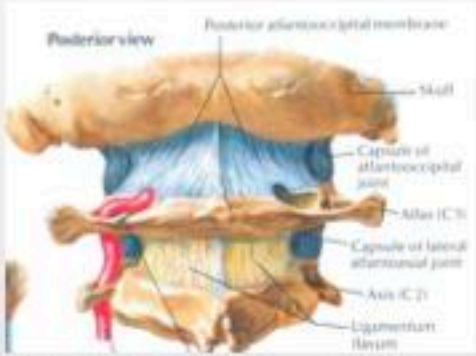
Treatments tried in past to eliminate suboccipital knot: Physical Therapy, TENS, Ultrasound, Neck Manipulation by PT, Massage, Triggerpoint Injections, Acupuncture- Suboccipital, Chiropractic, CR Appliance followed by Equilibration

Atlas (C1)

Top bone of spinal cord supports the skull

No disc C1-C2
Allows Rotation





Atlas is attached to the skull by ligaments

Discs are Hyaline Cartilage
Fibrous union: 8° rotation

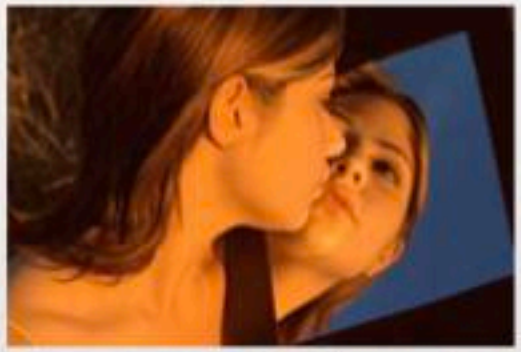
Rotation:

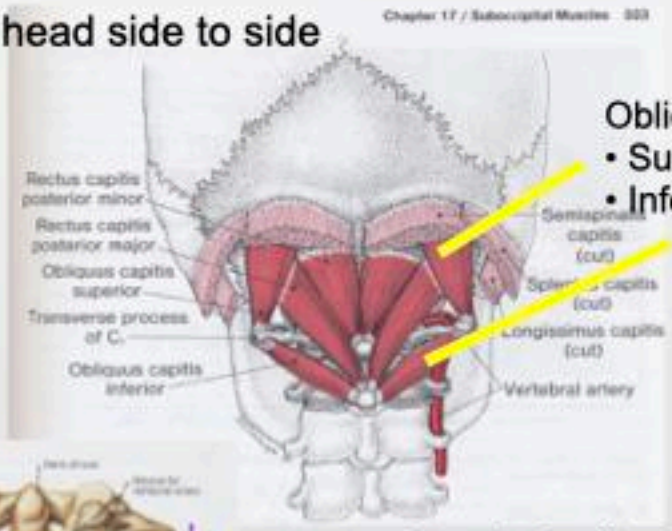
Atlas to skull	4°
C1 to C2	160°
C2 to C3	8°
all others	8°

Flex-Extend:

Atlas to skull	25°
C1 to C2	20°
C2 to C3	12°

C1/C2 allows you to turn your head side to side





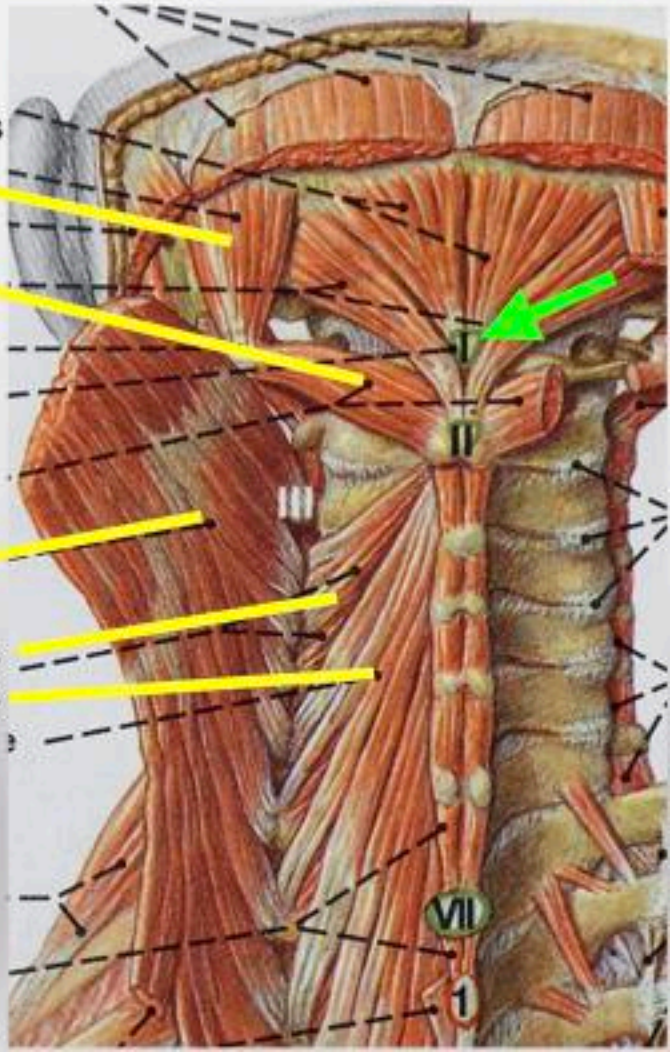
Oblique Capitus
- Superior
- Inferior

Semispinalis Capitus

Multifidus
Semispinalis Cervicus

Atlas spinal process not attached to a lower transverse process

From Clemente's Anatomy Book

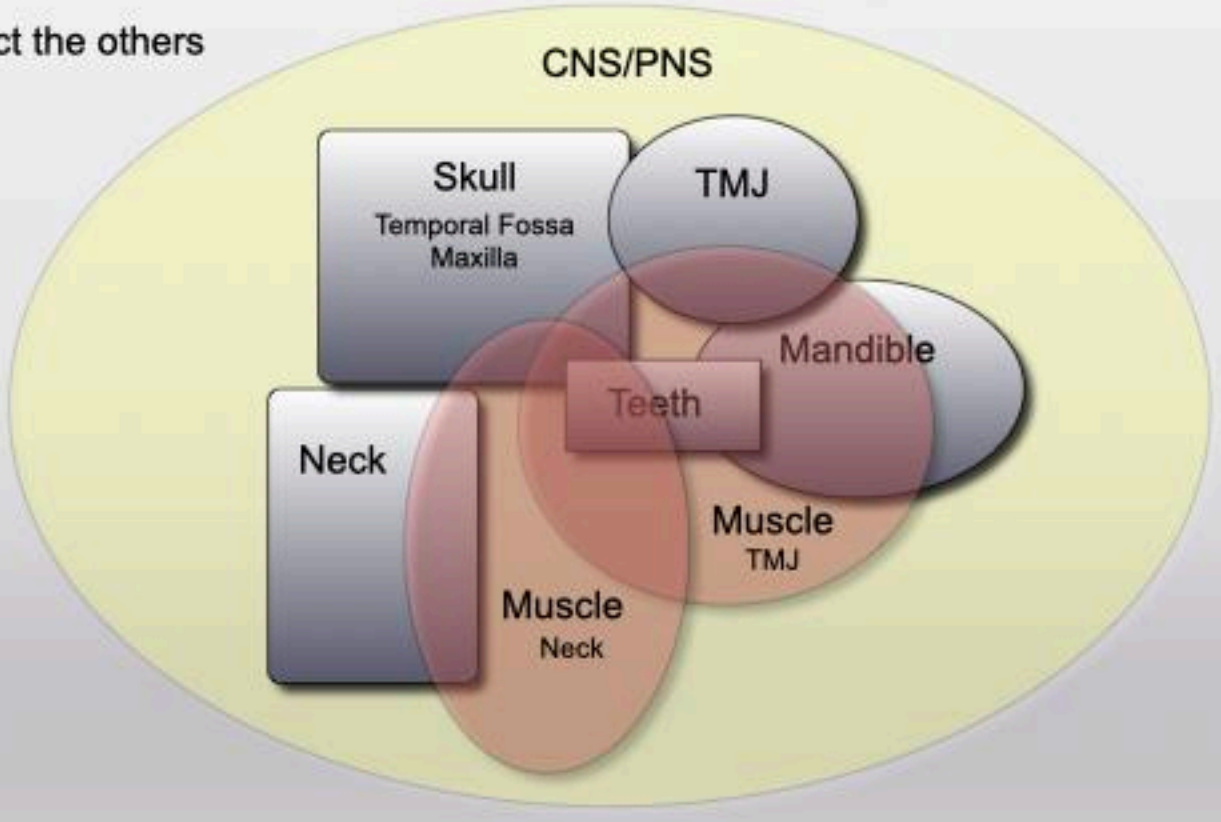


Stomatognathic System Interrelationship

A change in any one area will affect the others

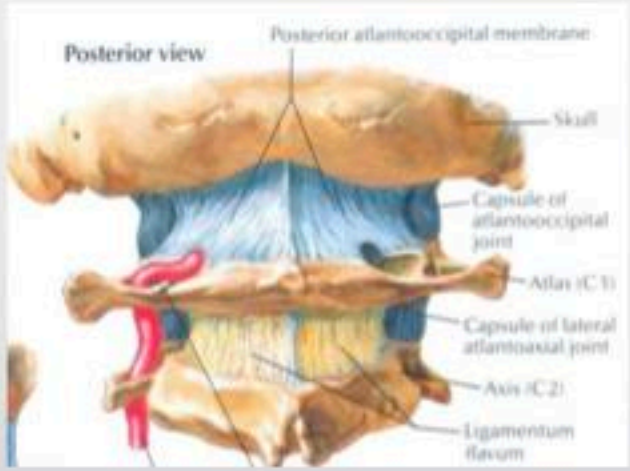
"Adaptation"

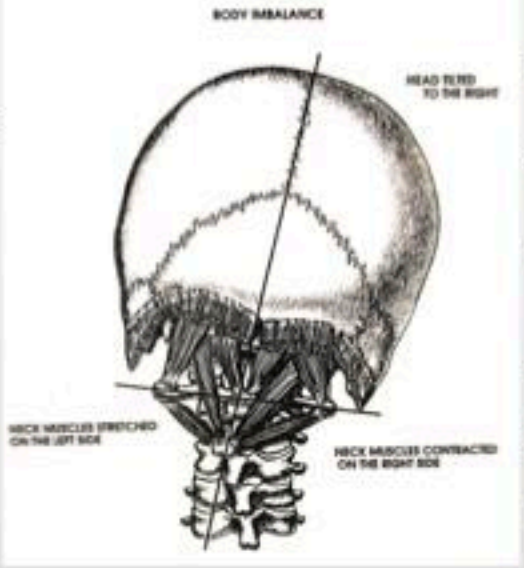
This is a dynamic orthopedic System

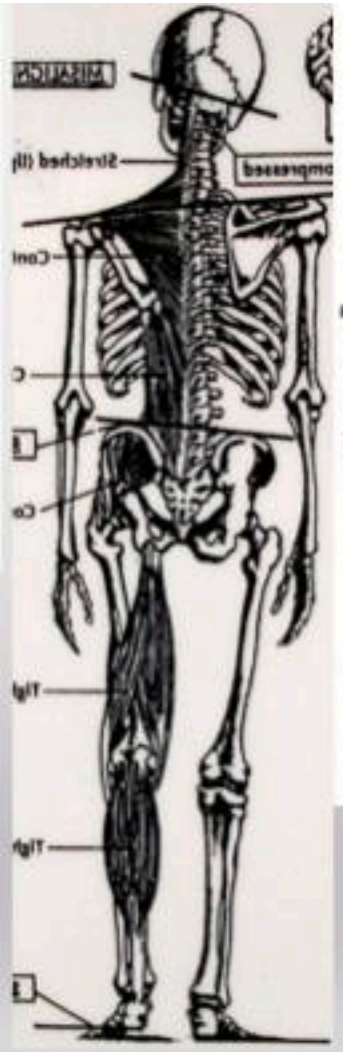


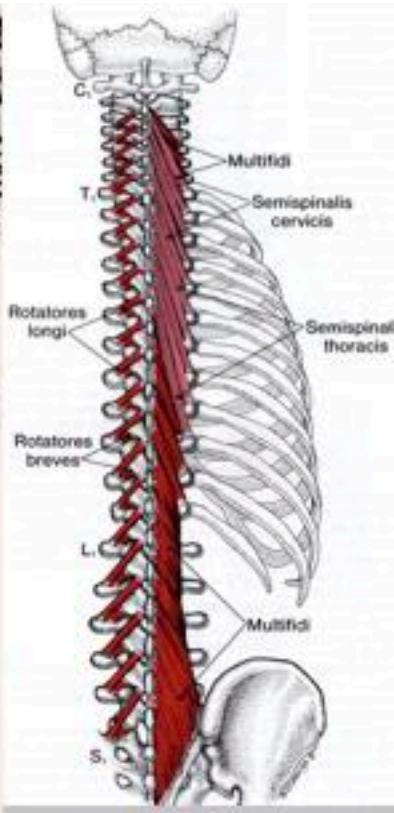
Atlas Subluxation

Trauma tears or stretches C1/ Skull ligament









Atlas Subluxation causes muscle bracing throughout the whole spinal muscle complex. One hip will be elevated giving the appearance of a short leg.

A change in any one area will affect the others

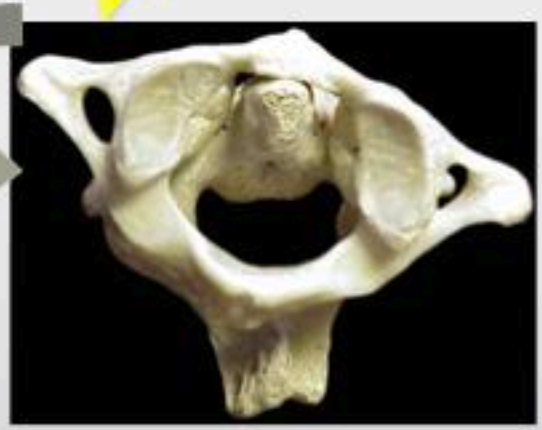
This is a dynamic orthopedic System

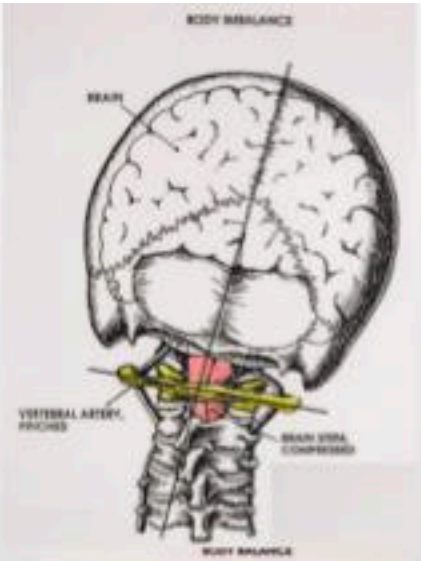
Atlas Orthogonal Adjustment

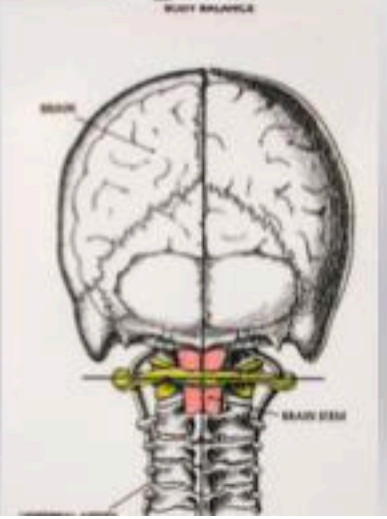
Dr. Roy Sweat

Atlas Orthogonist
Branch of Chiropractic Medcine

Uses sound wave to move atlas,
disrupts muscle bracing

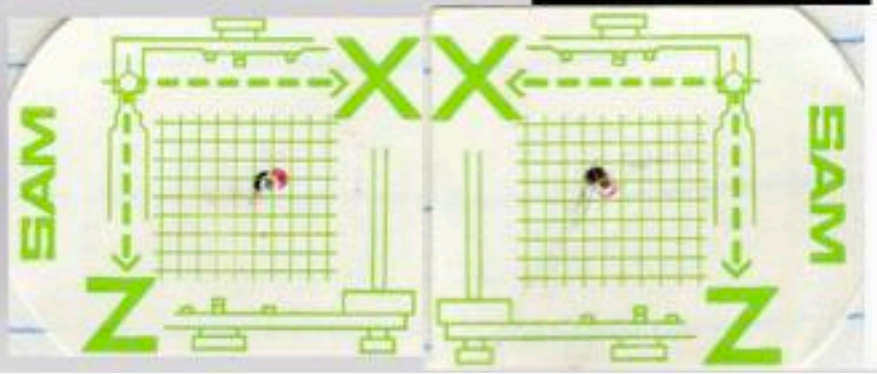






Atlas (C1) Observations:

Once atlas is reduced, other therapies progress much better.
Atlas can subluxate again as ligaments are still damaged
The longer atlas is in, the more likely it will stay in
Cartilage and bone changes shape over time.
Occlusion will be different with atlas in and atlas out, about 0.5mm
Occlusal appliances can help stabilize the atlas once it is reduced
Glucosamine helps neck become stable- ?cartilage adaptation?



CR Changes with Atlas position

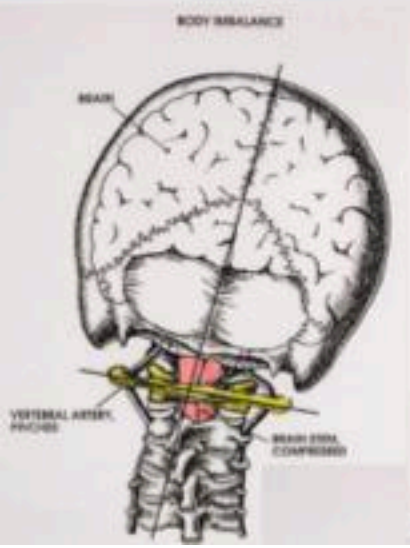
?Pressure on Occiput moves Temporal bone?

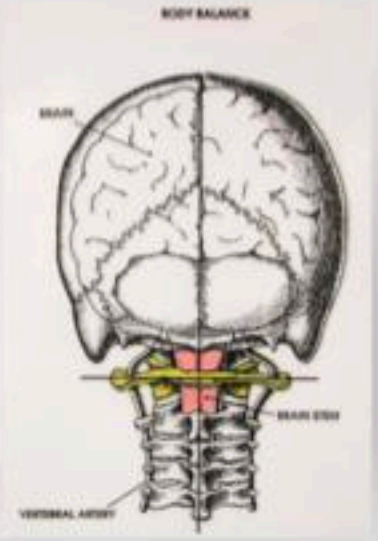
Put your teeth together and bend neck side to side

SAM Articulator Vericheck

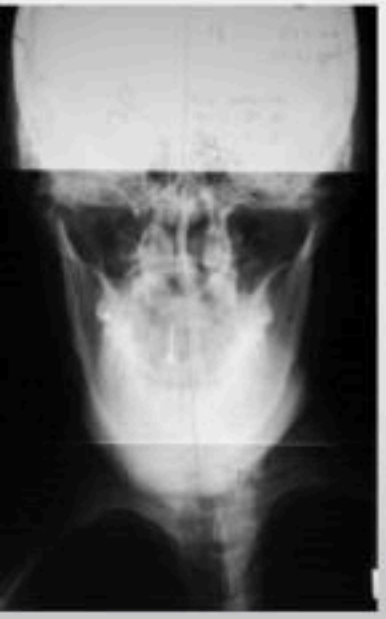
Right Condyle
Black- Atlas Out
Red- Atlas in shifts condyle up and forward 0.6mm

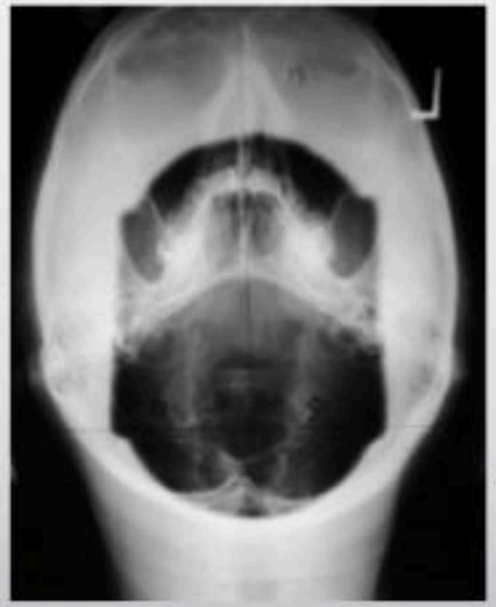
Left Condyle
Black- Atlas Out
Red- Atlas in shifts condyle down and back 0.5mm

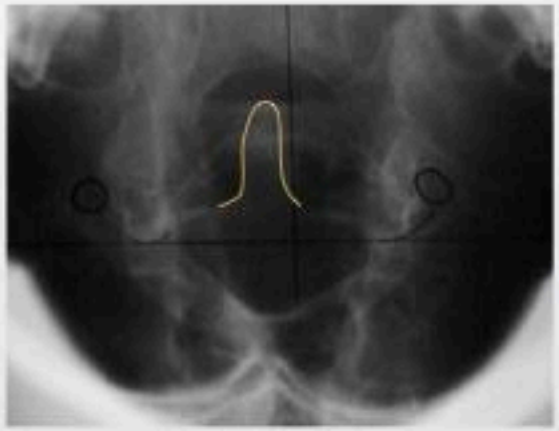




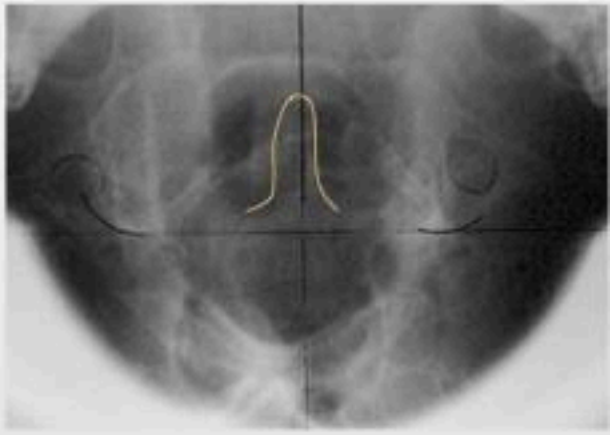
My Neck





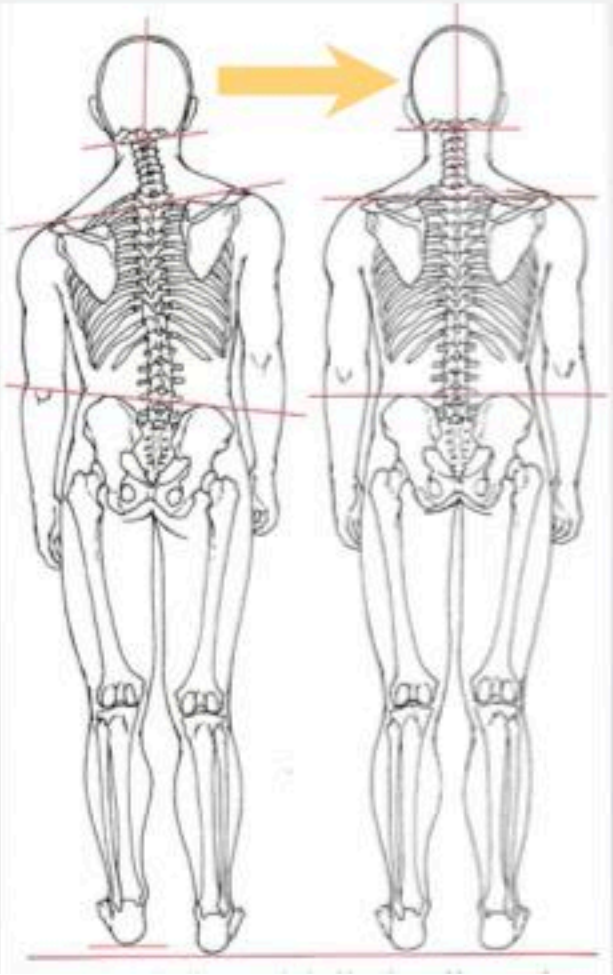


Before Atlas Adjustment



After Atlas Adjustment

Atlas Reduction



Many therapist place a heel lift thinking it is a leg length discrepancy

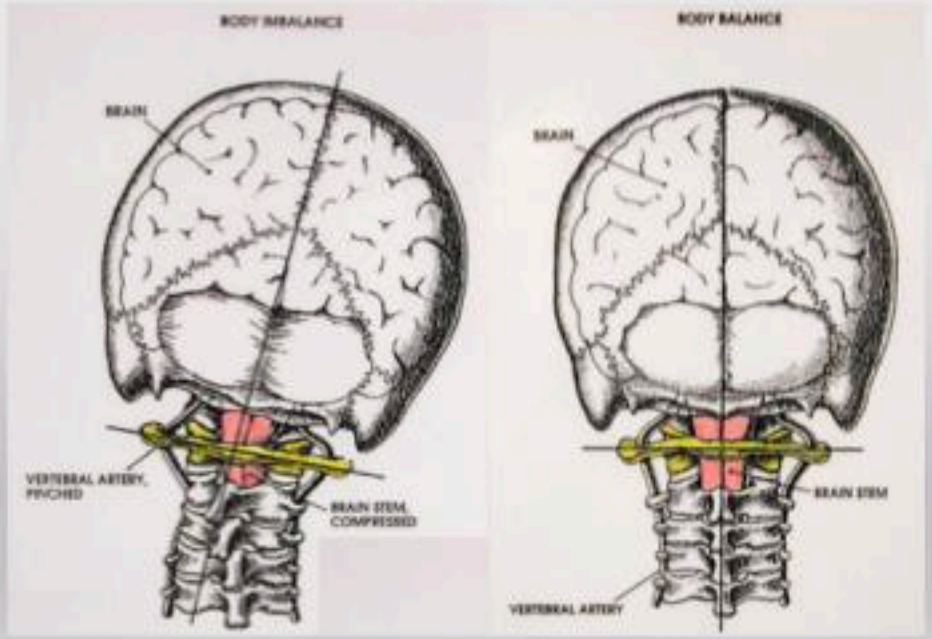
With atlas reduction the hip drops and the knot at the base of the skull clears instantly

Note: you do not get perfect realignment of all the bones as illustrated, but it is a start.

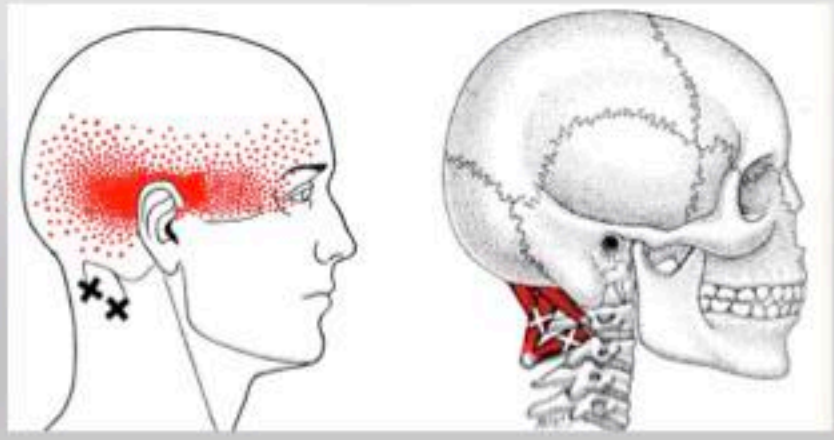
Finding An Atlas Orthogonist

www.atlasorthogonality.com

My Observations
- 50% of Atlas Doctors seem to be good
- Most snappers and crunchers are useless or dangerous



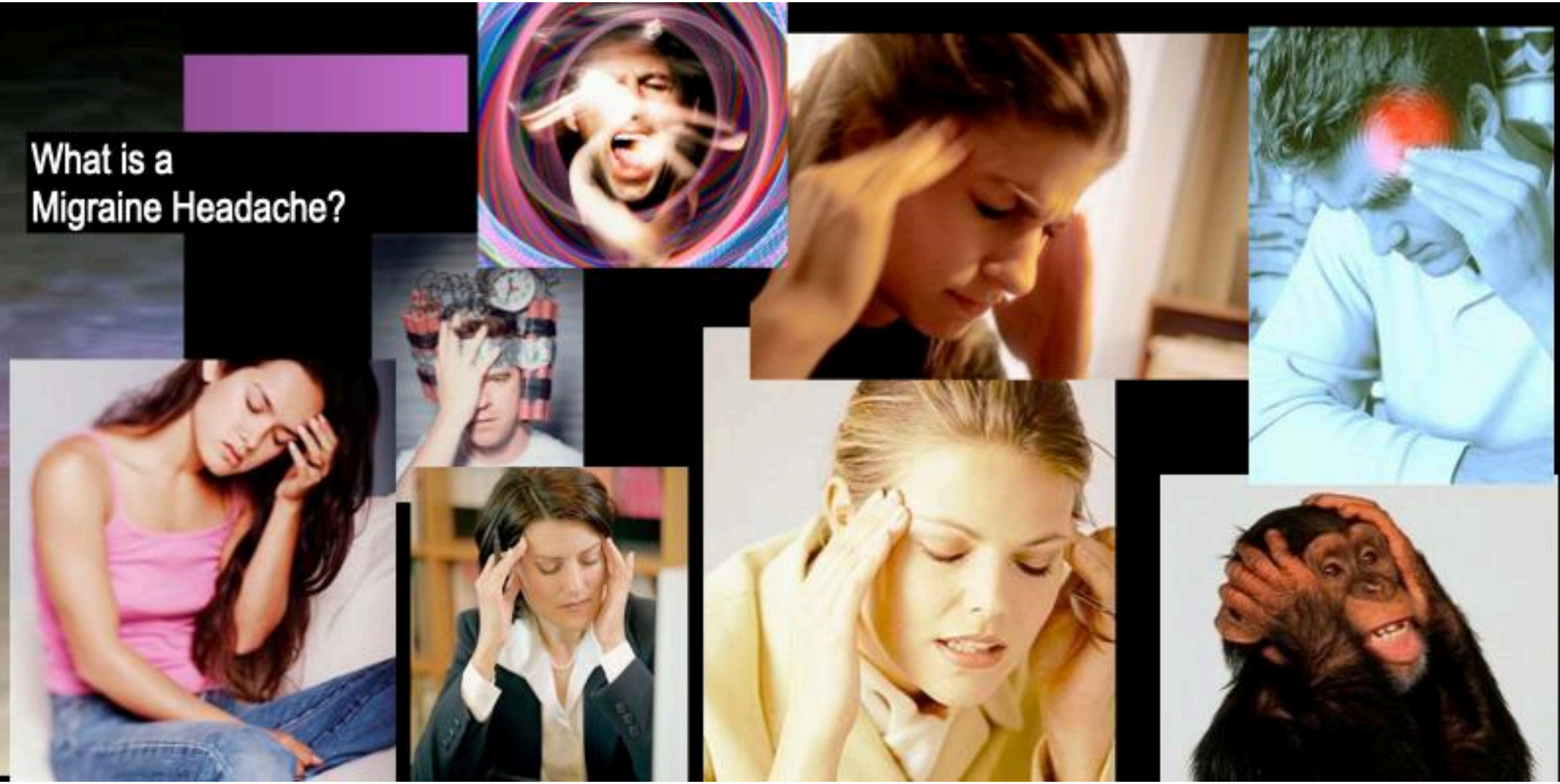
Atlas Orthogonist is only group of therapist I have found who can get rid of muscle knot at C2



Migraine Headaches

John R Droter DDS
Annapolis, Maryland

What is a Migraine Headache?

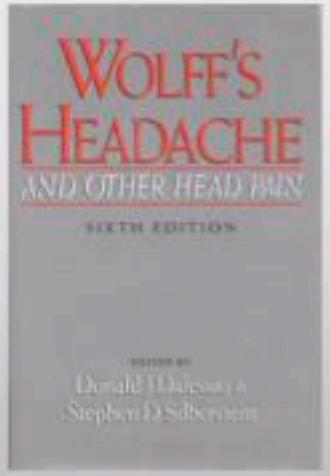


Migraine Headaches Stages

Diminished Cortical Perfusion

Cortical and Extra-cranial Vasodilation

Pain: Extra-cranial Arteriole Distension



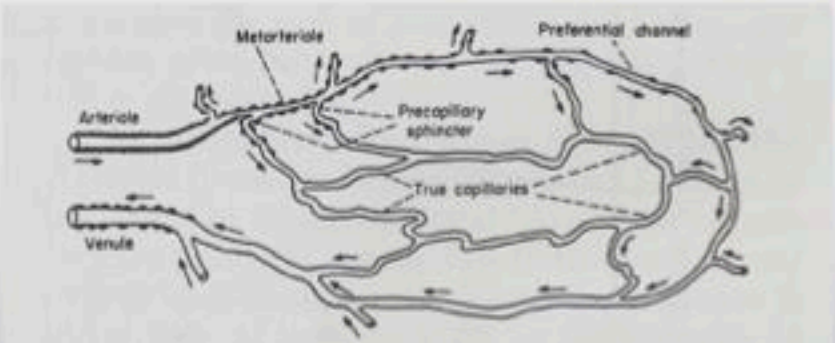
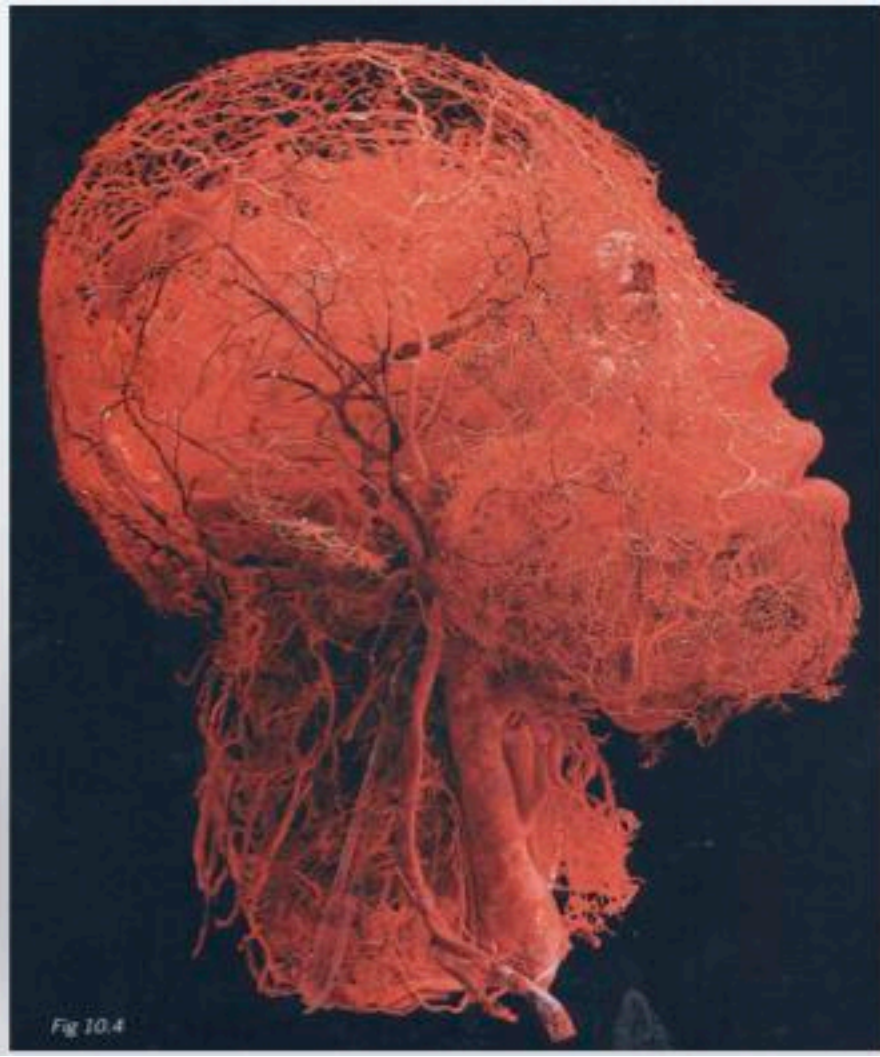


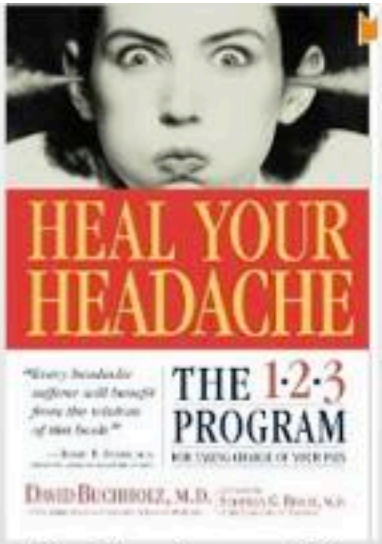
Figure 20–1. Overall structure of a capillary bed. (From Zweifach: Factors Regulating Blood Pressure. Josiah Macy, Jr., Foundation, 1950.)

Gunther von Hagens



Treatment of migraines

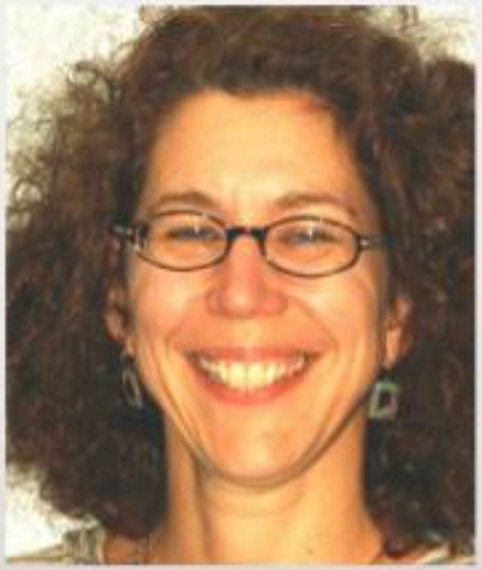
My observations of Migraines
- 70% Neck/TMJ alignment related
- 20% environmental- histamine triggers
- 10% unknown



Certain foods can trigger histamine release in sensitive Individuals

Common medications to tx
Sumatriptans: Imitrex

cc: Migraines Headaches 3-4x/week



Appliance Therapy

- 50% Reduction in Frequency
- 50% Decrease in Severity

After Neck Therapy: Atlas Correction

- 100% Resolution of Migraines

Finalized by Occlusal Adjustment with atlas in place

Vertebral Artery
From C2 into brain, artery makes 4 90° bends

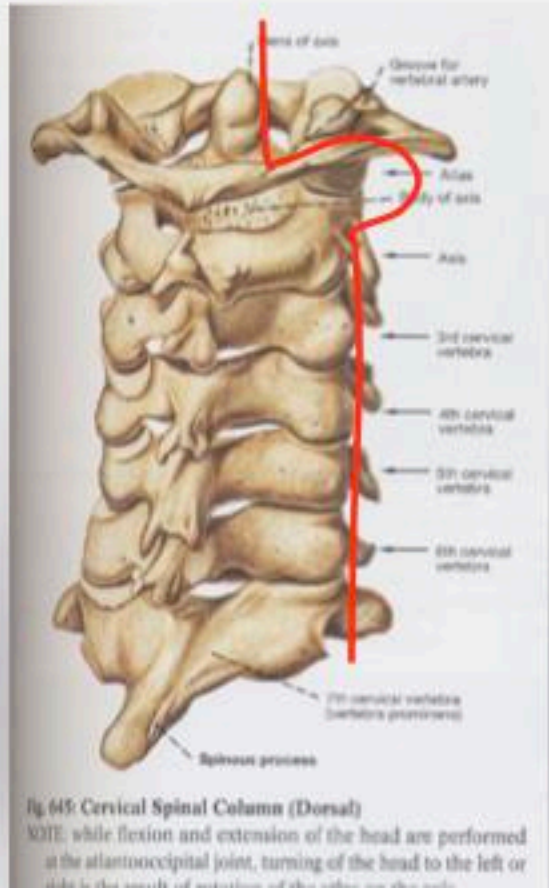
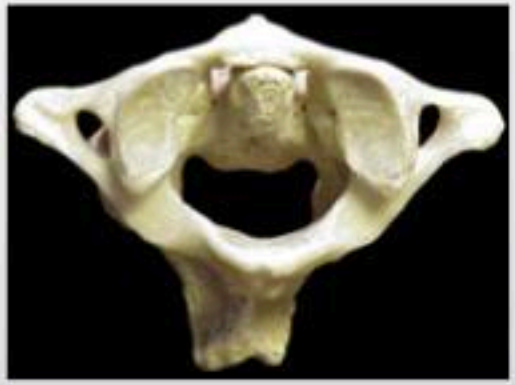
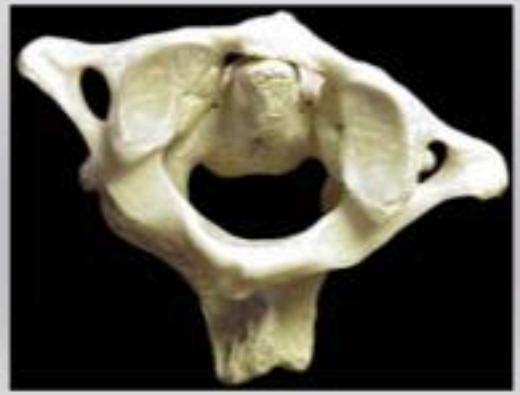
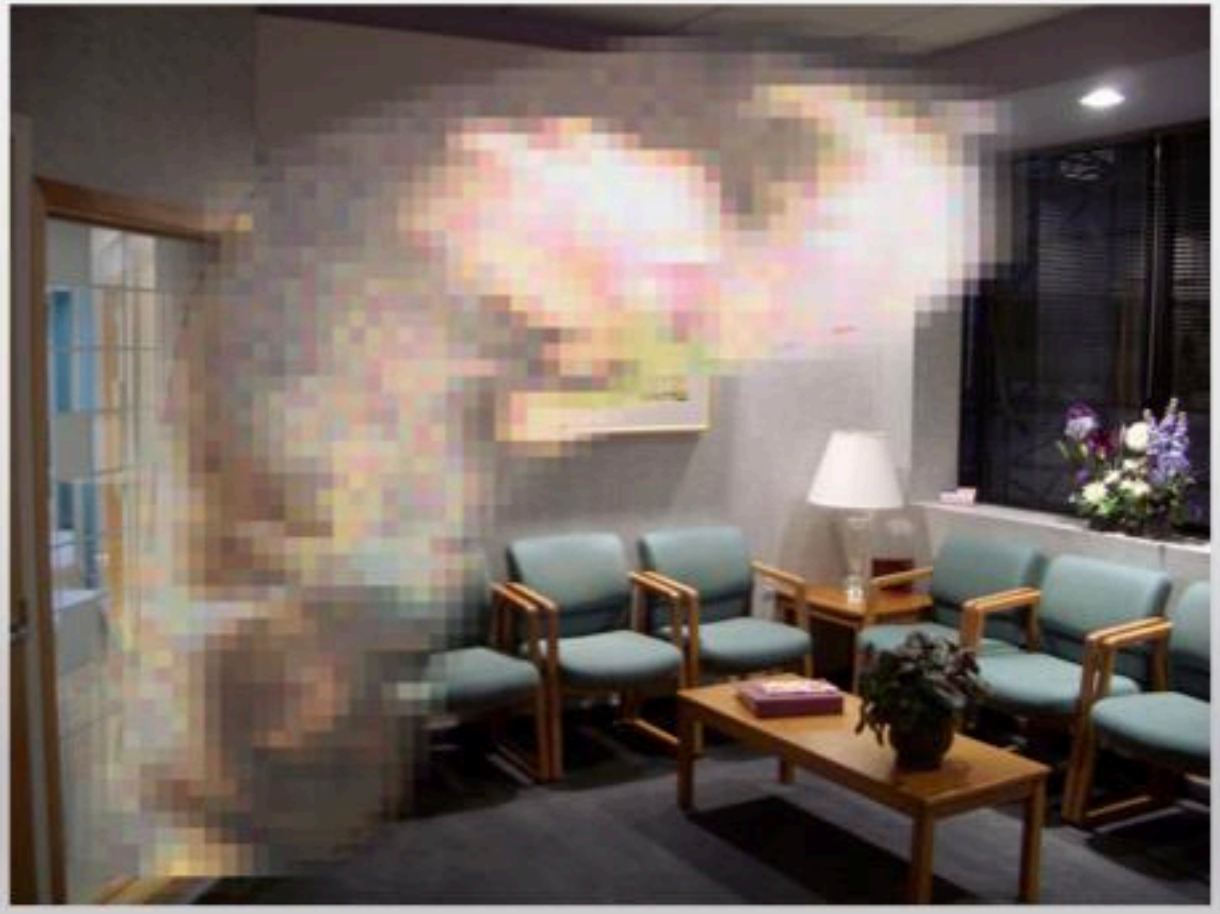


Fig 645 Cervical Spinal Column (Dorsal)
NOTE while flexion and extension of the head are performed at the atlantooccipital joint, turning of the head to the left or

Atlas Subluxation has to affect artery flow





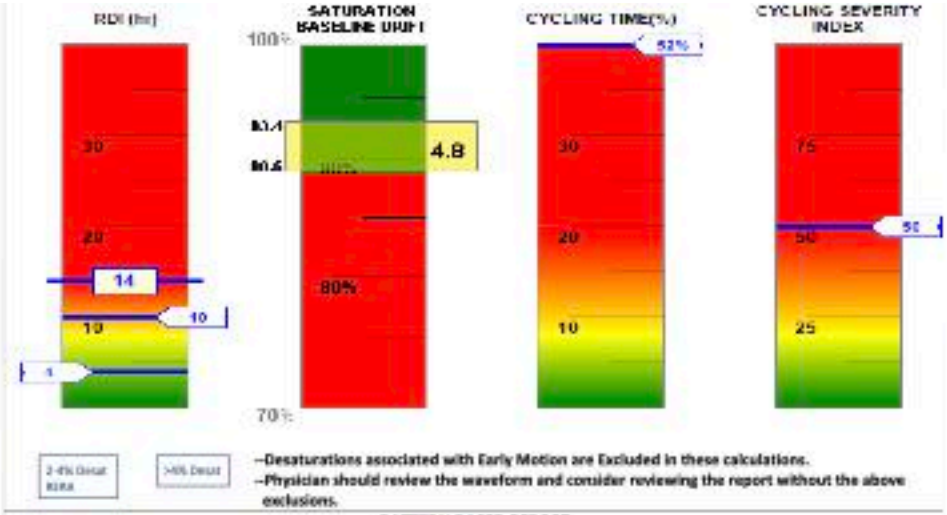


Show JK

Facial Pain Diagnosis

Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. Anterior Stop Test
5. **Sleep Airway Screening**
6. CT Scan
   MRI
   Blood Tests



--Desaturations associated with Early Motion are Excluded in these calculations.
--Physician should review the waveform and consider reviewing the report without the above exclusions.

PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 2 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

Obstructive Sleep Apnea

Normal Airway

Upper Airway Resistance
Snoring in men, purring in women

Obstructed Apnea

Images from Somnodent. https://somnomed.com/us

Is there an airway issue?
(Upper Airway Resistance or Obstructive Sleep Apnea)

"Sleep Airway Screening"

High Resolution
Pulse Oximetry

Data every 1
second average
over 3 seconds

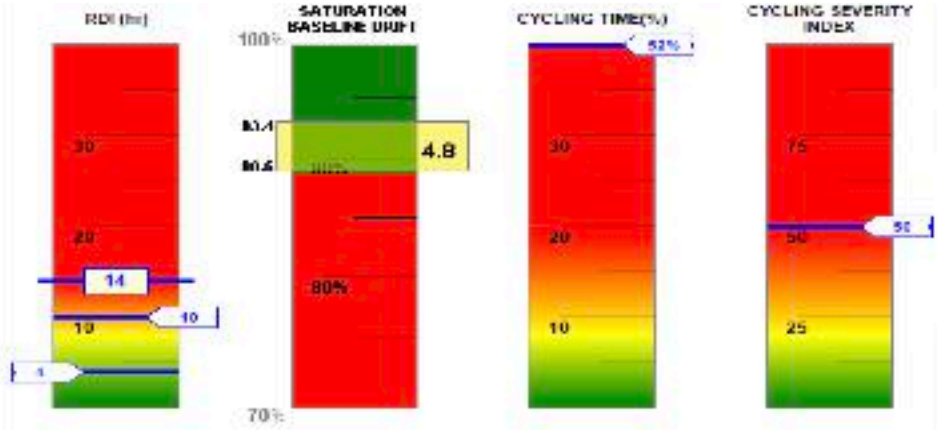
Patient Safety Inc.

SLEEPSAT

SATSCREEN

Order Pulse Ox and Software: Go to my website or
www.patientsafetyinc.com

Sleep SAT is the replacement for
PULSOX 300i, Konica Minolta no longer made



PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 3 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

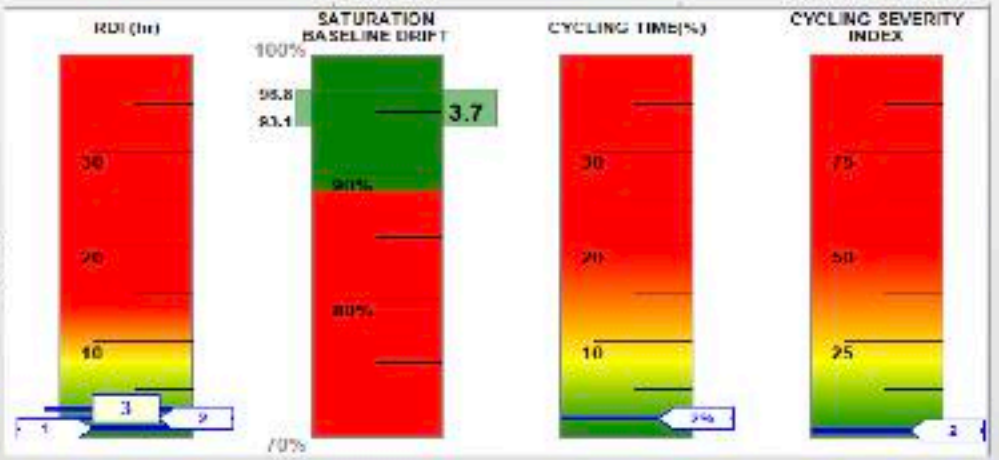
%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

Does the dental orthotic make the airway better or worse?

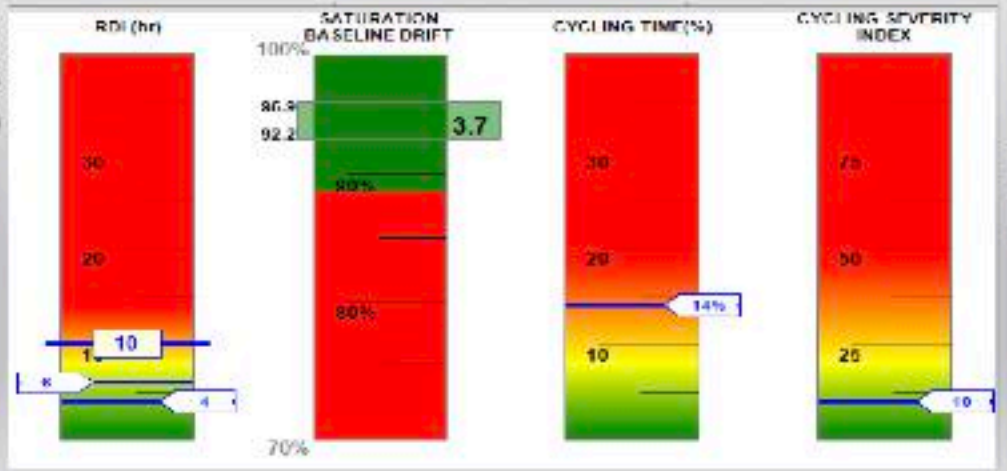
RDI= Respiratory Distress Index

Sometimes D-PAS makes airway better, sometimes worse

No dental orthotic
RDI = 3



Dental Orthotic:
Anterior Stop: D-PAS
RDI =10



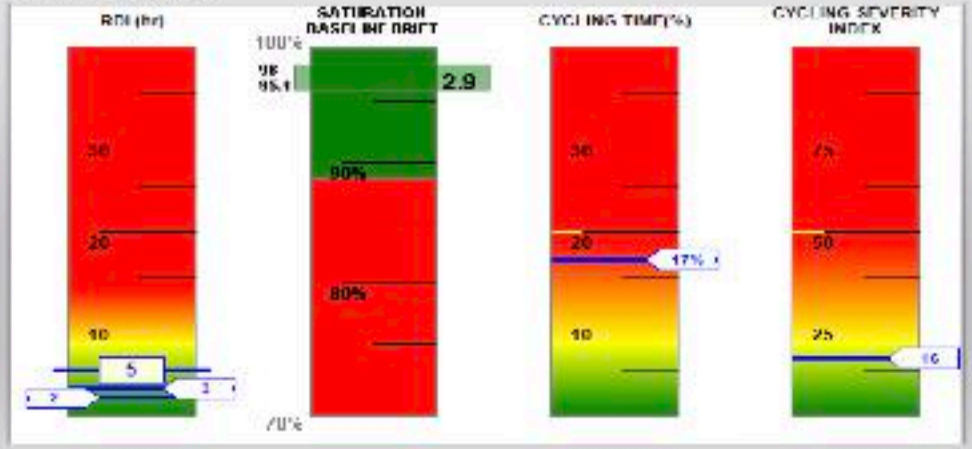
High Resolution Pulse Oximetry

PULSOX 300i, Konica Minolta with data analysis Patient Safety, Inc.

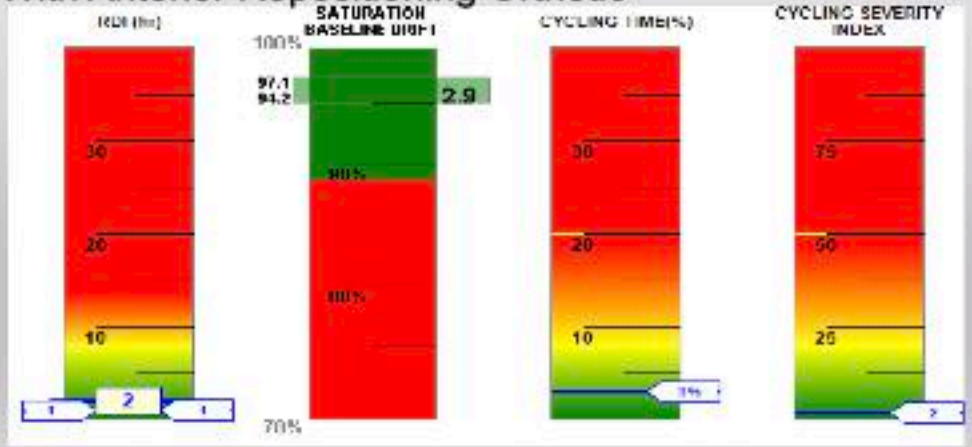
Anterior Repositioning Orthotic

Minolta Pulse Ox

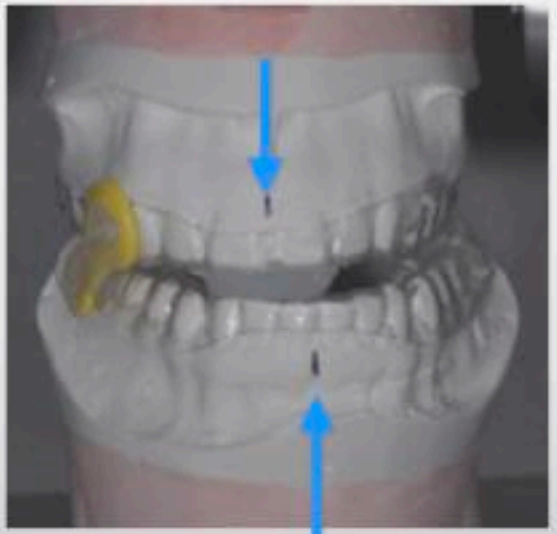
No Orthotic



With Anterior Repositioning Orthotic



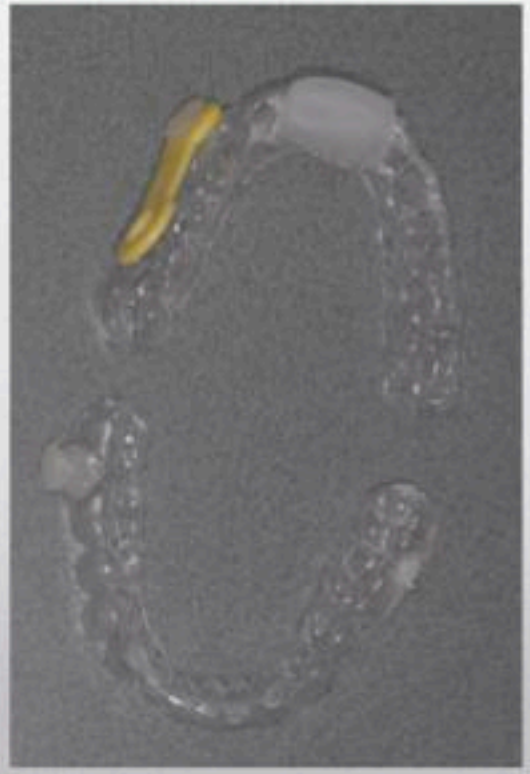
D-LatBrux Lateral Bruxing Orthotic



Elastomer Pulls Right condyle forward out of fossa.
Moves the jaw to the **Left.**

Anterior Occlusal Stop opens the bite and provides vertical support.

D-LatBrux Lateral Bruxing Orthotic



Pull Left

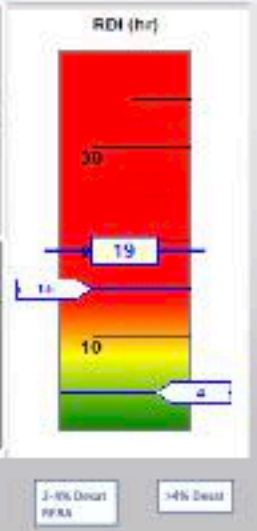
Pull Right

Only one joint is strained at night. Alternating nights wearing Right then Left gives an extra 24 hours of adaptation time to the system, minimizing permanent bite changes.

Note- simulated Left image reverse of Right

Management

Diagnosis	Pattern	Treatment
Obstructive Sleep Apnea	Variable……..	Mandibular Advancement Appliance (after MD approves)



PULSOX 300i, Konica Minolta
with data analysis Patient Safety, Inc.

Pulse Ox Screening

Refer to Medical Sleep Doctor

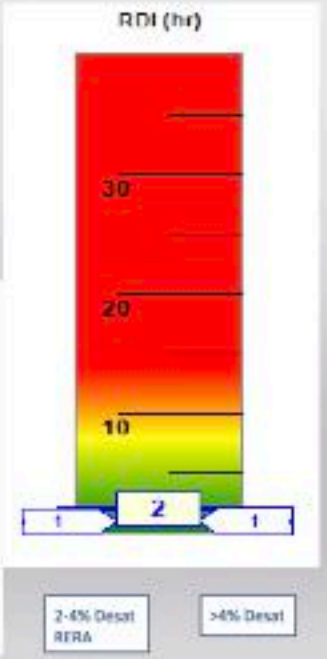
Get approval for Mandibular Advancement Appliance

Verify Airway Improves

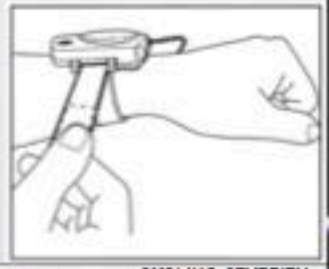
19 events/hr before

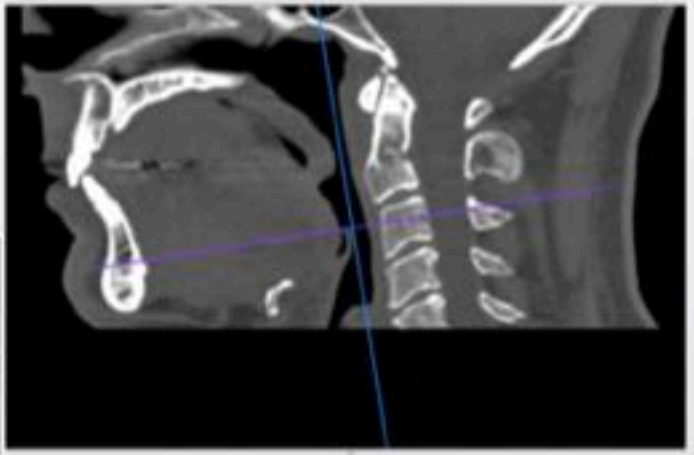
2 events/hr with Orthotic

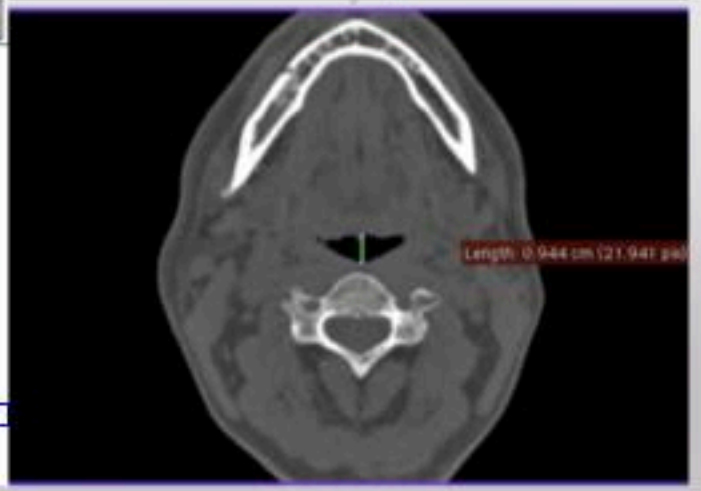
Narval CC
Great Lakes Ortho

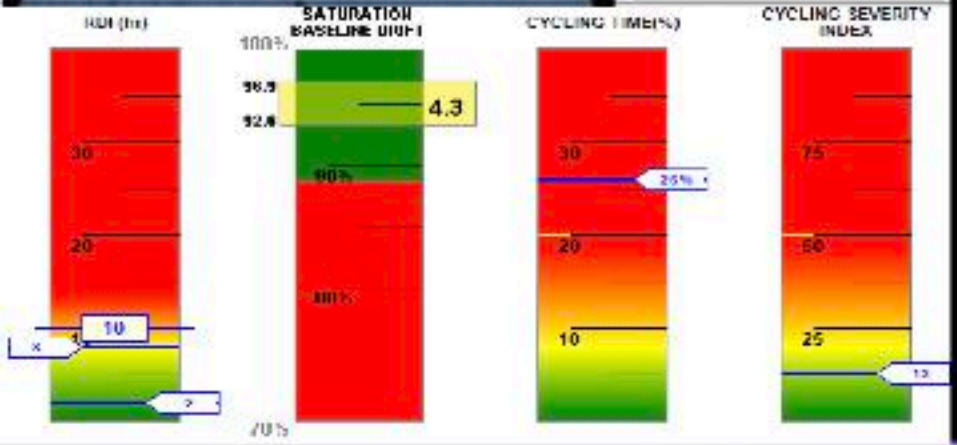


Mild Obstructive Sleep Apnea









Referred to pulmonologist
Medical Sleep Study
PSG- Polysomnogram
RDI 10

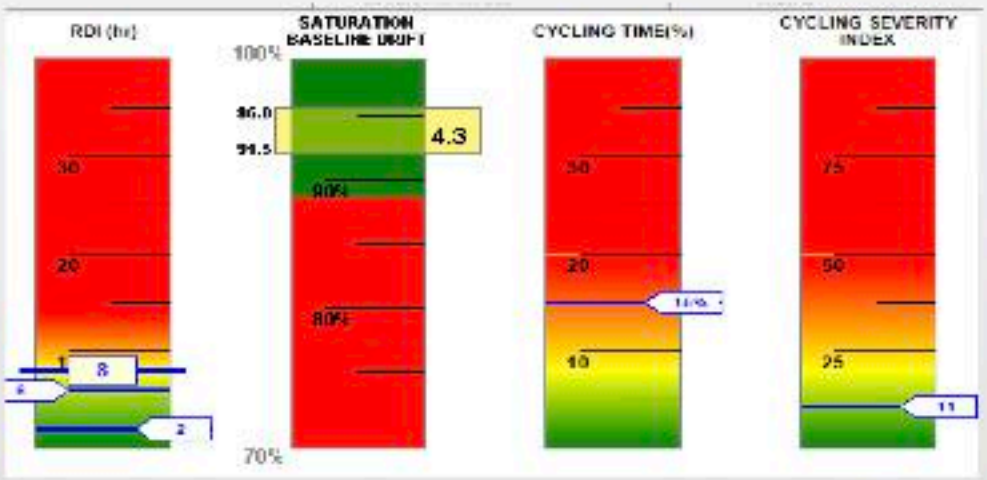
Home Sleep Airway Screening- RDI 10

RDI= Respiratory Distress Index

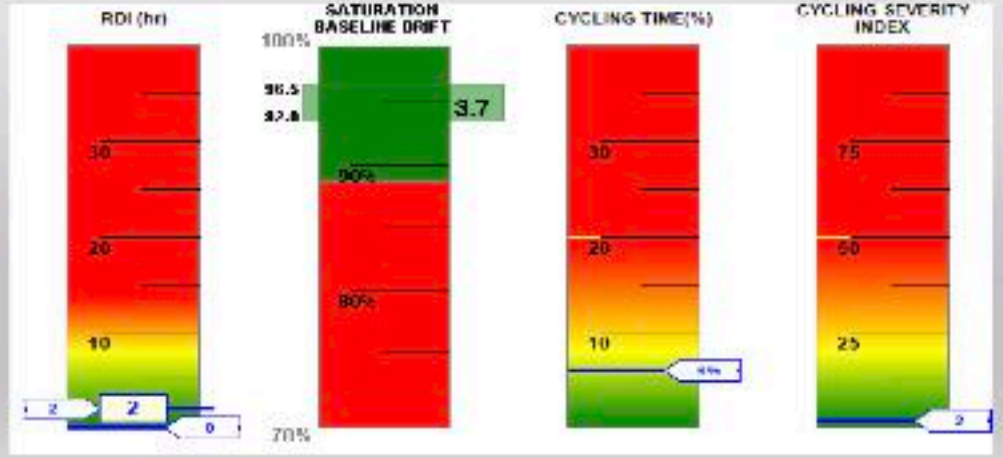
Mild OSA = 5-15 Apnea/hr

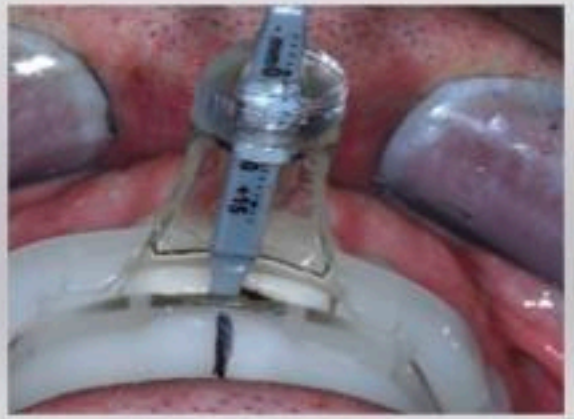
RDI= Respiratory Distress Index

MyTAP Mandible Advanced 4mm RDI 8



MyTAP Mandible Advanced 5mm RDI 2





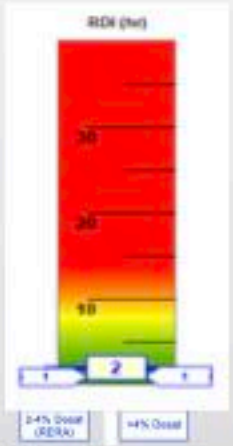
Age 16F
cc: Facial Pain, Excessive Daytime Fatigue

Age 16F
cc: Facial Pain, Excessive Daytime Fatigue

Medical Sleep Study in Lab RDI = 1
Dx: Snoring without evidence of gas exchange abnormalities or sleep disruptions

Sleep Latency Test
Dx: Narcolepsy
Recommend daytime medication

Patient Safety Inc Pulse Ox Sleep Screening
RDI = 2, Autonomic Arousals 31 /h



PULSE RATE DATA

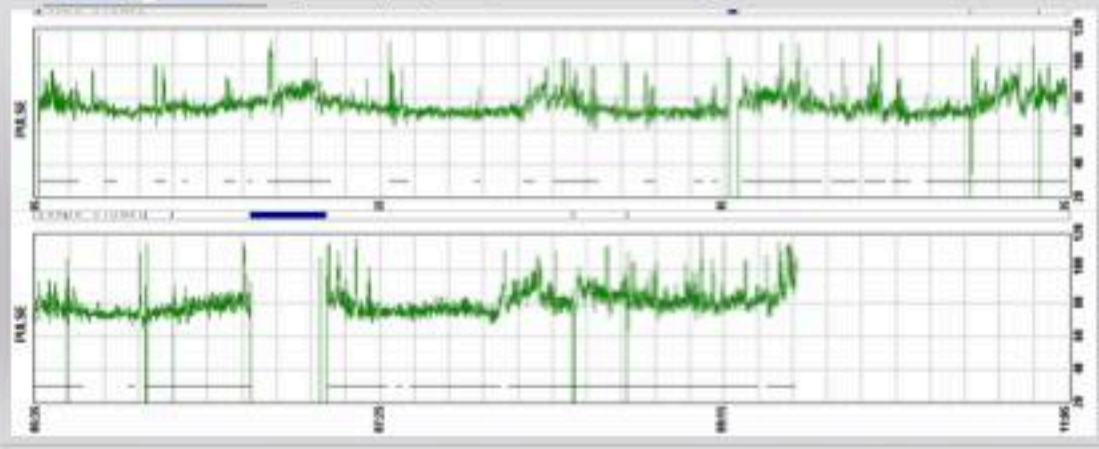
Autonomic Arousals
Index (#/hr): 31

Pulse Rate Range
Mean: 78
Min: 34
Max: 122

Tachycardia - Sleep (>90 bpm)
Duration: 00:34:56
% (VRT): 6%

Bradycardia - Sleep (<50 bpm)
Duration: 00:00:35
% (VRT): 0%

Heart Rate
>90 bpm
for 35 min



Disordered Breathing Disease Progression

Disease Stage 1

Predisposing Factors

Small Airway

Tongue Tie, Lip Tie
Bottle Fed as Infant
Dysfunctional Swallow
Allergies
Nasal Obstruction
Large Tonsil
Large Adenoids
Large Tongue
Mid-face Deficient
Mandibular Deficient
4 Bicuspid Extraction

Disease Stage 2

Compensation:
Airway Maintained

Signs
- Mouth Breathing
- Head Postured Forward
- Jaw Postured Forward
- Tongue Bracing
- Indents in Tongue
- Sore Masseters
- Sore Neck Muscles

Symptoms
- Facial Ache
- Not Waking Rested
- Daily Fatigue
- Neck Soreness

Disease Stage 3

Sleep
Airway Partial Collapse

Signs
- All of stage 1 and 2 plus…..
- Upper Airway Resistance
- 2-4% Drop O_2 Saturation
- RERA- Respiratory Arousals
- Sleep Teeth Grinding
- ⬇ Growth Hormone

Symptoms
- Heart Rate Fluctuation
- Snoring or "Purring"
- Weight Gain
- Cognitive Impairment, ADD
- Hyperactivity

Disease Stage 4

Sleep
Airway Full collapse

Signs
- All of stage 1, 2, 3 plus….
- 4%+ drop O_2 Saturation
- Apnea
- Cardiovascular Damage
- Elevated BP
- GERD

Symptoms
- All of stage 2, 3 plus….
- Worn Teeth

John R. Droter DDS

Disordered Breathing Disease Stage 4

OSA- Obstructive Sleep Apnea

AHI- Apnea Hypopnea Index

Apnea and Hypopnea events per hour

Apnea- Stop airflow for 10 seconds

Hypopnea- <50% airflow or 4+% O_2 Desaturation

AHI 1-4 "Normal" ??	AHI 5-15 Mild OSA	AHI 15-30 Moderate OSA	AHI 30+ Severe

Signs

Apnea

4% drop O_2 Saturation

Cardiovascular Damage

Elevated BP

GERD

Symptoms

Not Waking Rested, Daily Fatigue

Cognitive Impairment

Irreversible Damage

John R. Droter DDS

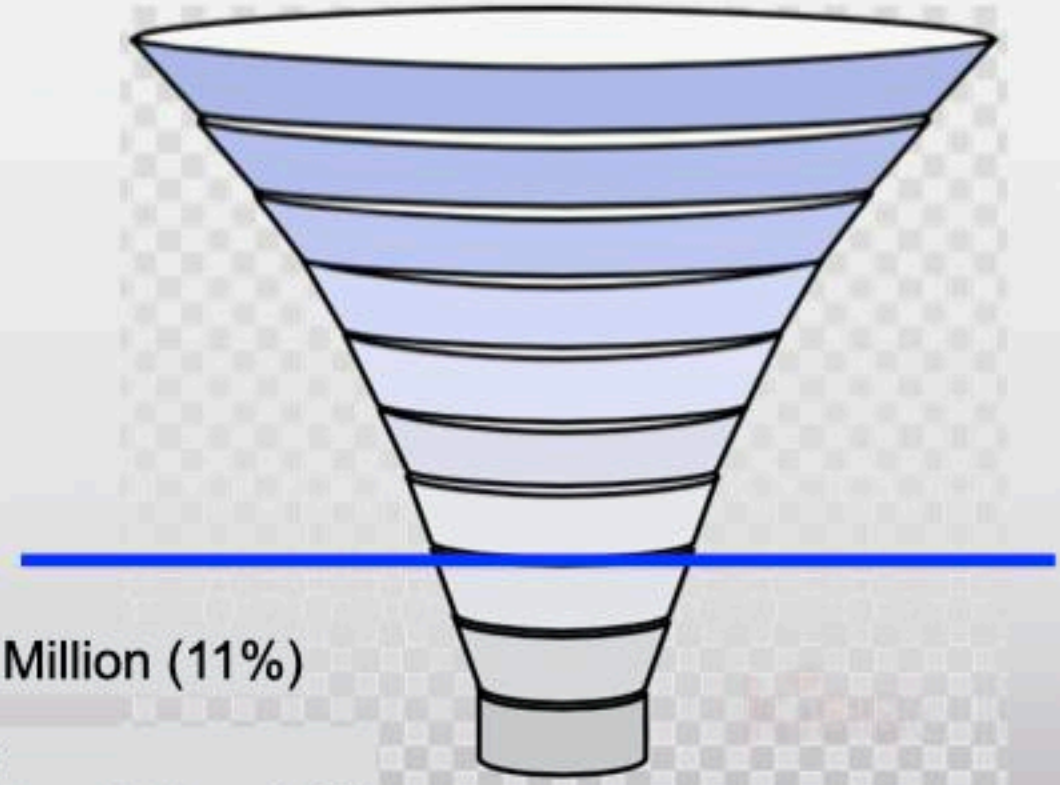
Disordered Breathing USA 2008

Stage 1

Stage 2

Stage 3

Stage 4



Mild OSA- 35 Million (11%)

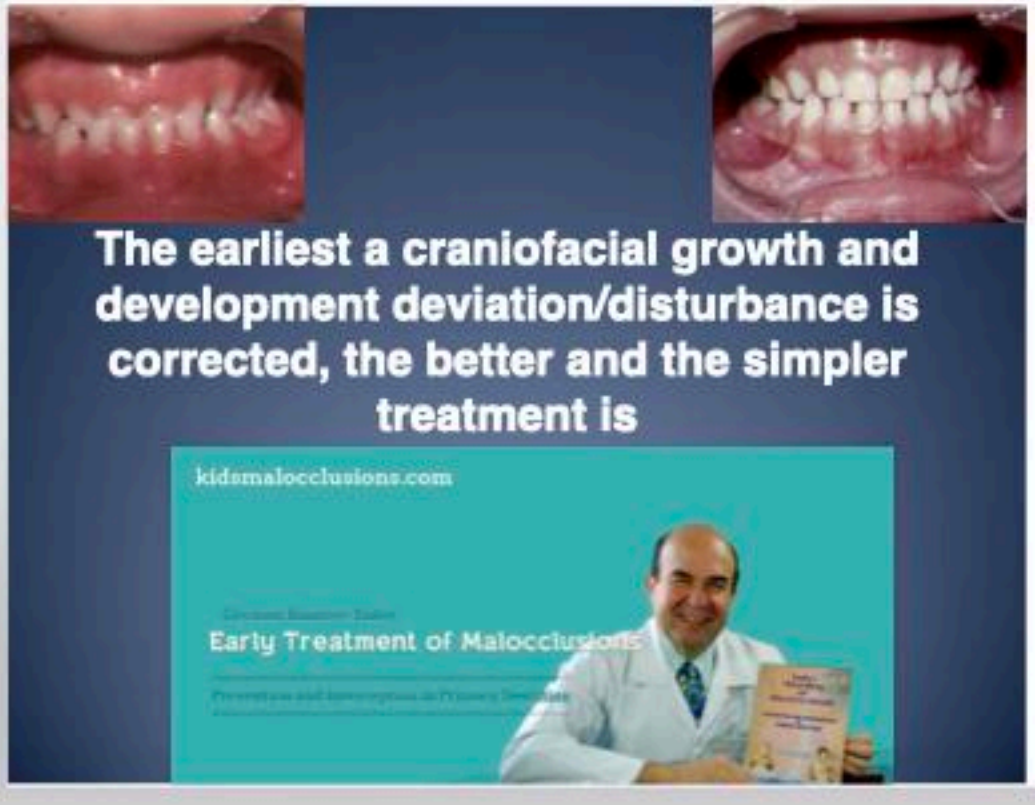
Moderate and
Severe OSA 19.5 Million (6%)

Young, T., Finn, L., Peppard, P. E., Szklo-Coxe, M., Austin, D., Nieto, F. J., et al. (2008). Sleep disordered breathing and mortality: eighteen-year follow-up of the Wisconsin sleep cohort. *Sleep*

US Pop 325 Million

Dr German Ramirez-Yanez

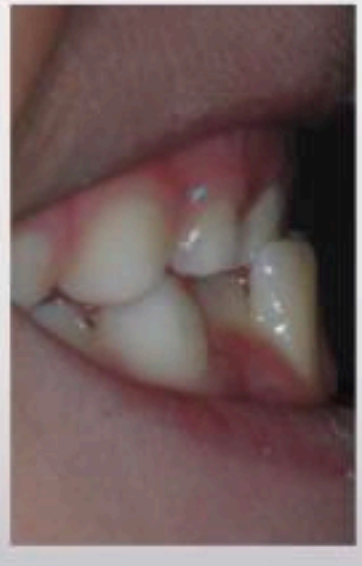
Get his **Free** Textbook on how to do this
kidsmaloccusions.com

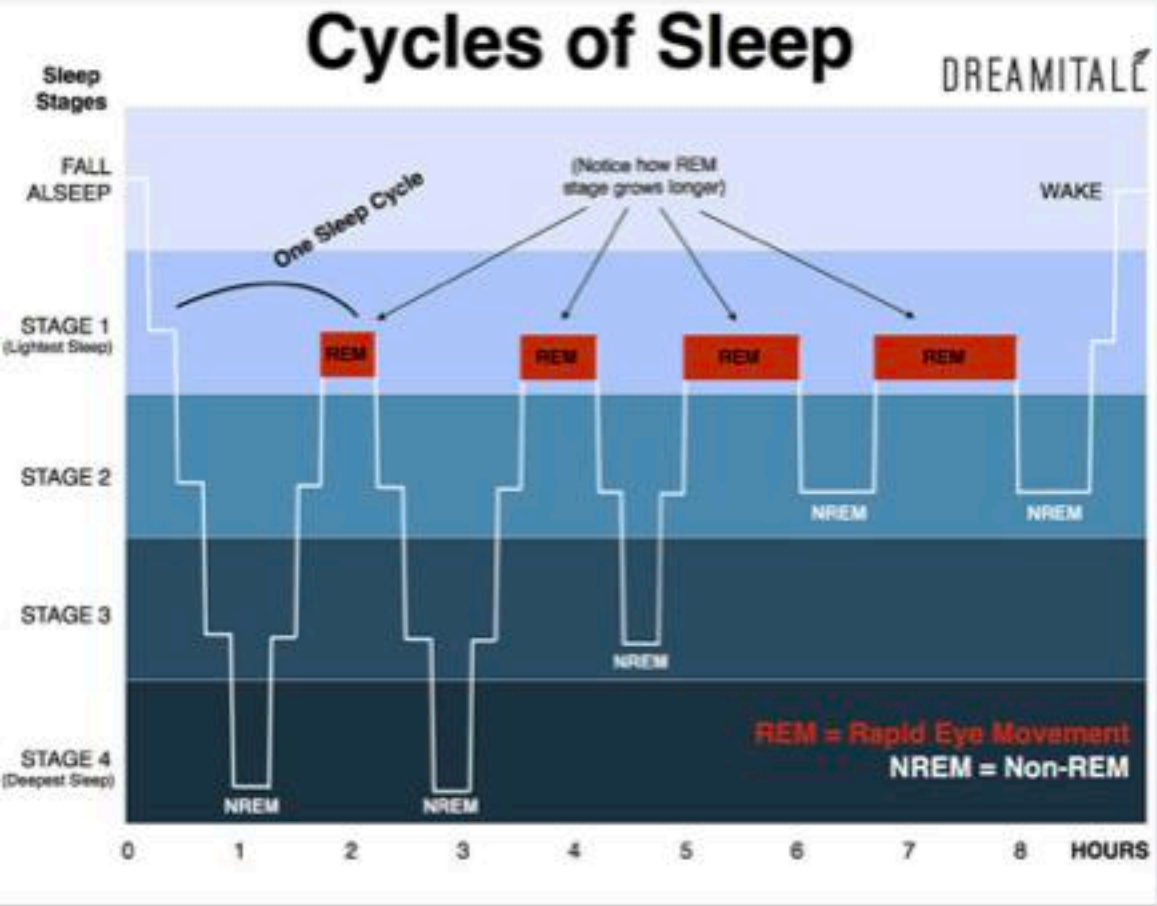


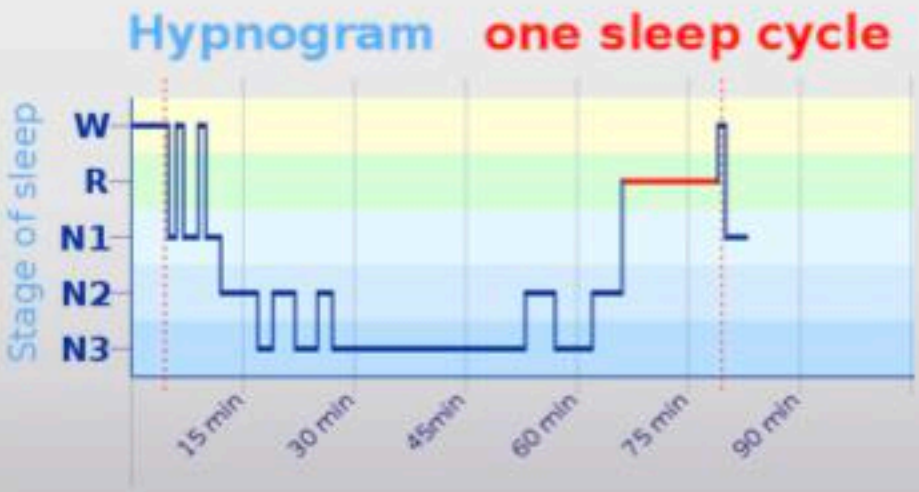
Start Age 7

Planas Tracks
Lingual Light Wire

Age 8
9 Months from start



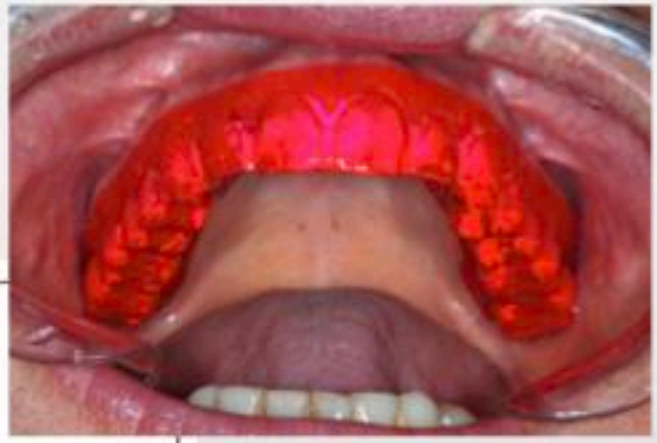

Cycles of Sleep
DREAMITALE
Sleep Stages
FALL ALSEEP
STAGE 1 (Lightest Sleep)
STAGE 2
STAGE 3
STAGE 4 (Deepest Sleep)
One Sleep Cycle
(Notice how REM stage grows longer)
WAKE
REM
NREM
REM = Rapid Eye Movement
NREM = Non-REM
0 1 2 3 4 5 6 7 8 HOURS

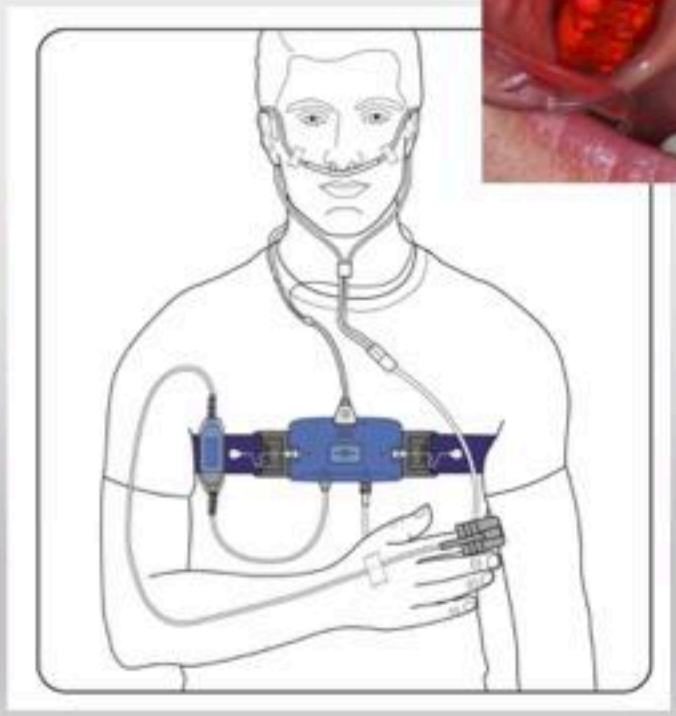

Hypnogram
one sleep cycle
Stage of sleep
W
R
N1
N2
N3
15 min
30 min
45min
60 min
75 min
90 min

zMachine

GENERAL sleep

zMachine + Brux Checker
+ Snore Lab





Call (888) 330-4424

Use Code: DROTER to receive special offer

Patient: M Y
Study Date: 2018-09-27 Study ID: 1124990976
3% Threshold

AHI: 8.9
AHI is how many times an hour your blood oxygen goes down.

RDI: 8.9
RDI is how many times an hour your sleep is disturbed due to respiration

Date of Birth: 1998
Age: 20
Sex: F

Height: 63 Inches
Weight: 105 Pounds
BMI: 18.60

Note:

GENERAL sleep
Zmachine® Synergy
Home Sleep Test Report
Study Ordered by:
John R. Droter, DOS
Scored by: Computer

Study Details: Computer Generated Scoring
The following parameters were recorded using a Zmachine Synergy (General Sleep Corporation): EEG for sleep staging & arousals; respiratory inductance plethysmography for thoracic respiratory effort; pressure transducer for respiratory airflow & snore; pulse oximeter for SpO2, pulse, & optical plethysmograph; and tri-axis accelerometer for body position. Hypopneas were scored per AASM recommended definition of 3% desaturation.

Times and Durations	
Lights off	2018-09-27 01:47:32
Lights on	2018-09-27 08:42:54
Total Recording Time (TRT)	936.8 min.
Time in Bed (TIB)	414.0 min. (81.7% of TRT) | 6 hours 54 minutes
Total Sleep Time (TST)	396.8 min. (95.9% of TIB)
Sleep Efficiency (SE)	95.9 % of TIB
Latency to Persistent Sleep (LPS)	8 min
Latency to Deep Sleep (LDEEP)	19 min
Latency to REM Sleep (LREM)	8.5 min
Total Light Sleep Time N1+N2	207.9 min. (52.4% of TST)
Total Deep Sleep Time N3 SWS	85.7 min. (34.1% of TST)
Total REM Time	83.2 min. (33.5% of TST)
SpO_2 < 89% cumulative time	0 min.
SpO_2 < 89% longest span	0 min.

Awakenings During Sleep	
Wake After Sleep Onset (WASO)	13 min
≥ 1-Epoch Awakenings	18 (2.7 per sleep hour)
≥ 3-Epoch Awakenings	0 (0 per sleep hour)

WASO is the cumulative wake time following LPS; ≥ 1-Epoch Awakenings is the number of times the patient woke for one epoch (i.e. 30 seconds) or more after LPS; and ≥ 3-Epoch Awakenings is the number of times the patient woke for three epochs or more after LPS (this is a subset of ≥ 1-Epoch

Sleep Study Ranges of Normal
Sleep Latency 10-20 min
Latency to REM 90 min
Sleep Efficiency >85%

N1 2% - 5%
N2 45% - 55%
N3 Deep Sleep 10% - 20%
If 8th: then 48 min. to 96 min
REM Sleep 20% - 25%
If 8th: then 96 min. to 120 min

REM to REM is about 90 min
4-5 cycle per night
REM time longer as night goes on

Deep N3 SWS slow wave sleep in first third of night. Less as we age

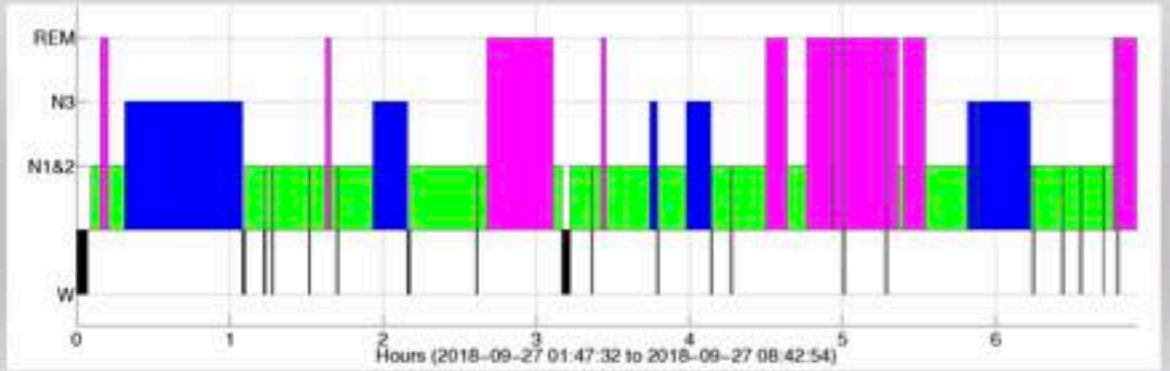
TRT is the total duration of the recording, TIB is the elapsed time from lights off to lights on; TST is the cumulative time scored as any stage of sleep; SE is 100x(TST÷TIB) expressed as a percentage; AHI is apneas + hypopneas per hour of sleep time; RDI is apneas + hypopneas + RERAs per hour of sleep time; and REI is apneas + hypopneas + RERAs per hour of recording time.

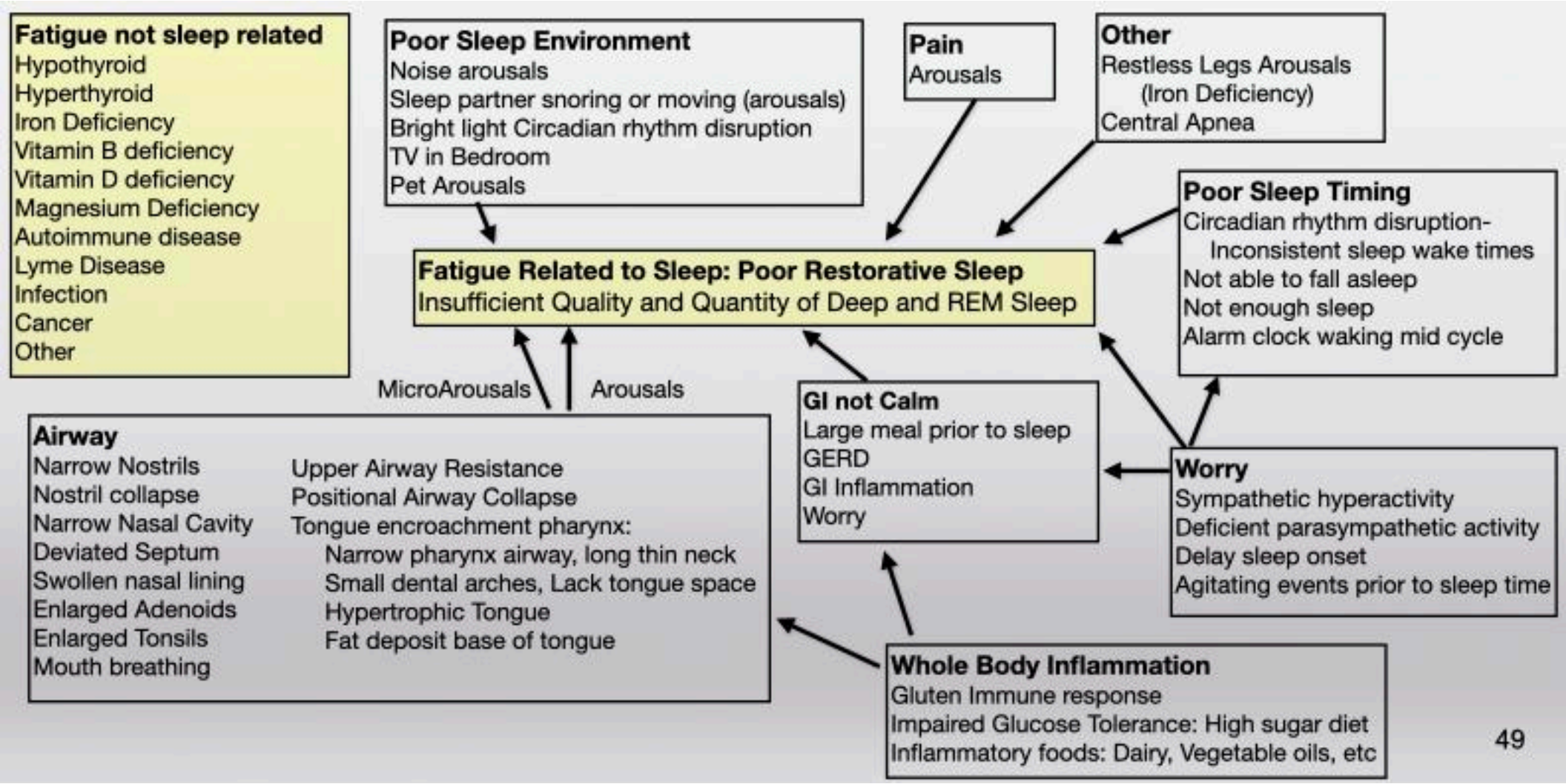
LPS is the elapsed time to the beginning of the first period in which 10 of 11 minutes are scored as any stage of sleep (i.e. the start of persistent sleep); LDEEP is the elapsed time to the beginning of first epoch of Deep Sleep; and LREM is the elapsed time to the beginning of first epoch of REM.

Respiratory Events

Body Position		
72.1%	Supine/hr	9.0
0%	Prone/hr	0
12.9%	Left/hr	4.5
14.8%	Right/hr	9.8

Sleep Stages




Fatigue not sleep related
Hypothyroid
Hyperthyroid
Iron Deficiency
Vitamin B deficiency
Vitamin D deficiency
Magnesium Deficiency
Autoimmune disease
Lyme Disease
Infection
Cancer
Other
Poor Sleep Environment
Noise arousals
Sleep partner snoring or moving (arousals)
Bright light Circadian rhythm disruption
TV in Bedroom
Pet Arousals
Pain
Arousals
Other
Restless Legs Arousals
(Iron Deficiency)
Central Apnea
Poor Sleep Timing
Circadian rhythm disruption-
Inconsistent sleep wake times
Not able to fall asleep
Not enough sleep
Alarm clock waking mid cycle
Fatigue Related to Sleep: Poor Restorative Sleep
Insufficient Quality and Quantity of Deep and REM Sleep
MicroArousals
Arousals
GI not Calm
Large meal prior to sleep
GERD
GI Inflammation
Worry
Worry
Sympathetic hyperactivity
Deficient parasympathetic activity
Delay sleep onset
Agitating events prior to sleep time
Airway
Narrow Nostrils
Nostril collapse
Narrow Nasal Cavity
Deviated Septum
Swollen nasal lining
Enlarged Adenoids
Enlarged Tonsils
Mouth breathing
Upper Airway Resistance
Positional Airway Collapse
Tongue encroachment pharynx:
Narrow pharynx airway, long thin neck
Small dental arches, Lack tongue space
Hypertrophic Tongue
Fat deposit base of tongue
Whole Body Inflammation
Gluten Immune response
Impaired Glucose Tolerance: High sugar diet
Inflammatory foods: Dairy, Vegetable oils, etc

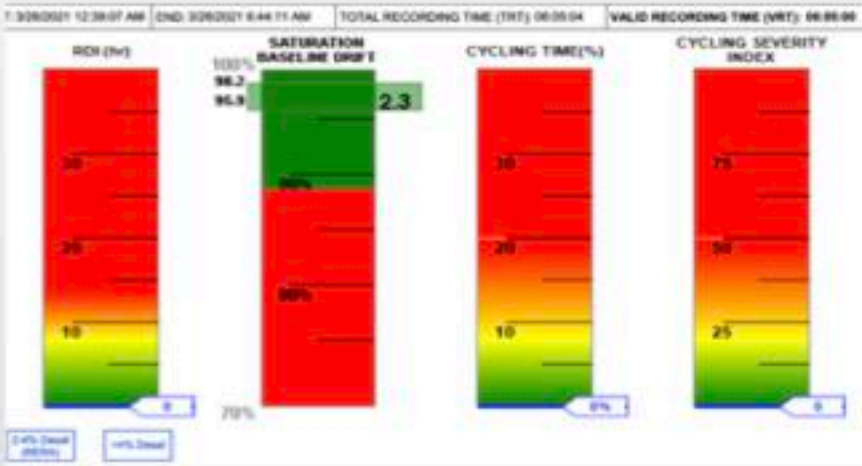
Sleep Simplified

1. Need adequate Deep and REM Sleep every night.
2. Need to get oxygen through the nose to lungs, unimpeded, all the time.
3. Parasympathetic Dominance in non REM Sleep

Sleep Complexity:
- Problems are Numerous.....
- Tests are Numerous.....
- Therapies are Numerous.....

Always go to the back to basics:
- 60+min Deep and 90+min REM
- Air from Nose to Lungs
- Large periods of calm, steady heart rate

Sat Screen by Patient Safety Inc



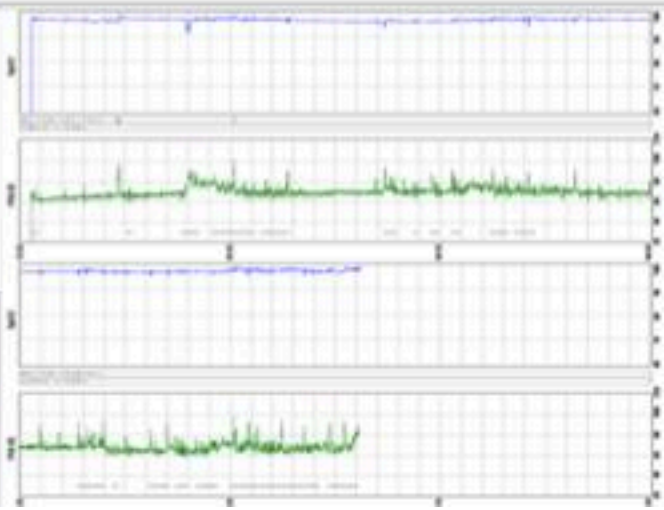
PULSE RATE DATA

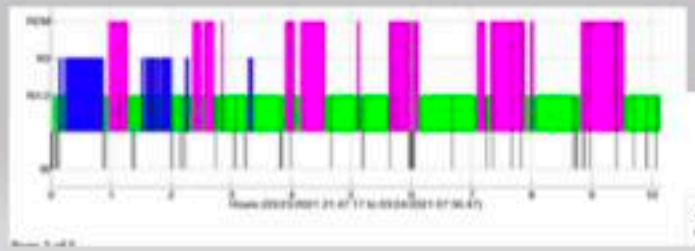
Autonomic Arousals

Index (#/hr): 23

Pulse Rate Range

Mean:	69
Min:	58
Max:	102





AHI: 0.5

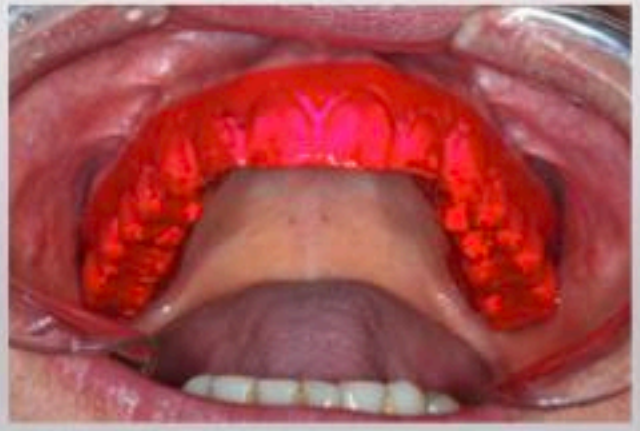
AHI is how many times an hour your blood oxygen goes down.

zMachine: Interrupted Deep and REM

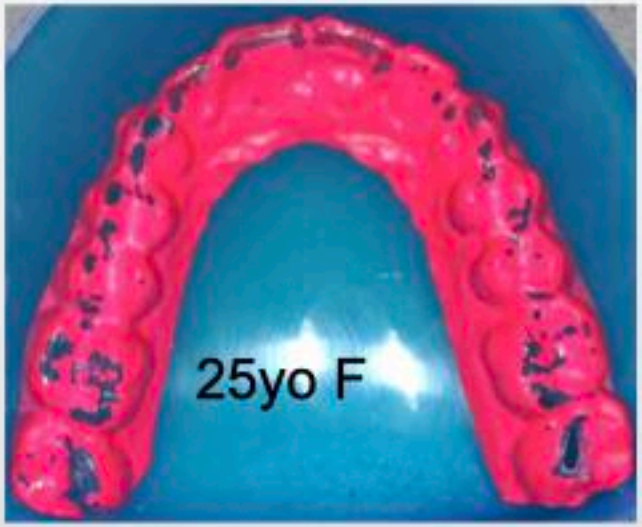
Does grinding occur awake or asleep?

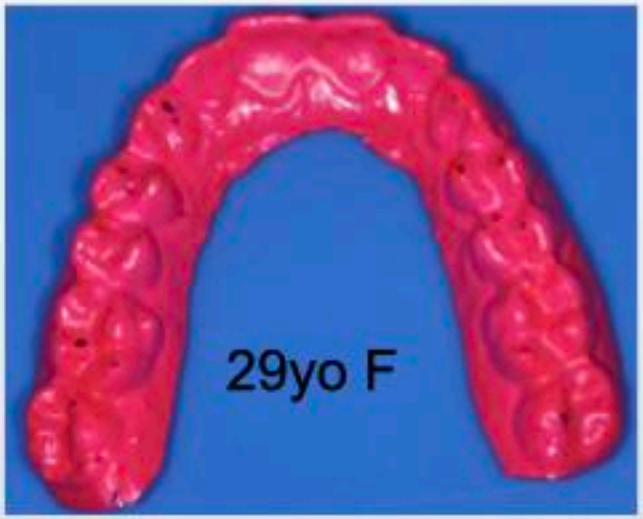
Brux Checker
Great Lakes Orthodontics

0.1mm Mylar



Made on Biostar Machine





Daytime Clenching- Clear Brux Checker

Increase awareness to break habit

Very thin: Similar to mylar used for composites

Great Lakes Orthodontics
Biostar Platzhalterfolie
Item Ref 3202.1


Know Yourself
Know Your Work
Know Your Patient
Apply Your Knowledge
LD Pankey Institute
Write your Dream

TMD Symptoms

Limited Opening

Diseases to consider and rule out:

- Pain Avoidance Sore Joint
- Pain Avoidance Sore Muscle
- Hematoma
- Muscle Spasm
- Masseteric Space Infection
- Nonreducing Disc (4b,3b Acute)
- Joint Fibrosis, Muscle Fibrosis
- Other

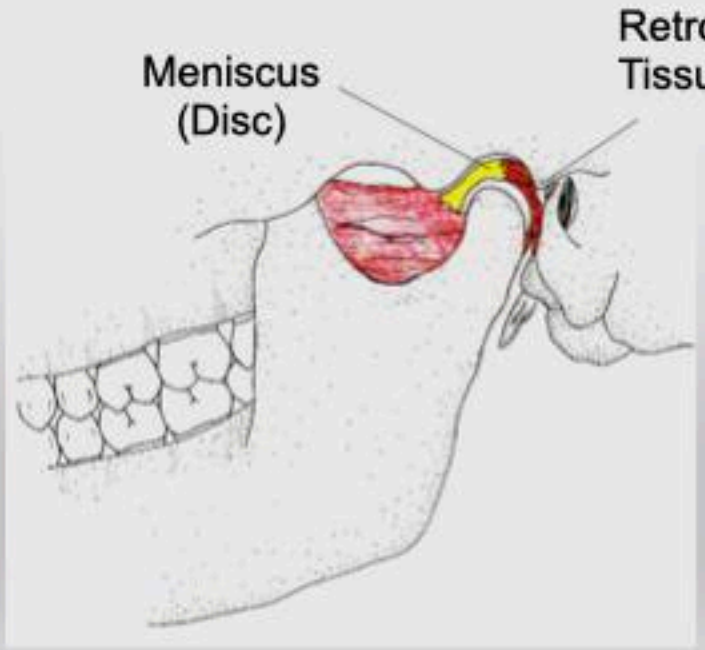
A joint joins two bones that allows movement between the two bones

TMJ has 2 Joint Compartments:

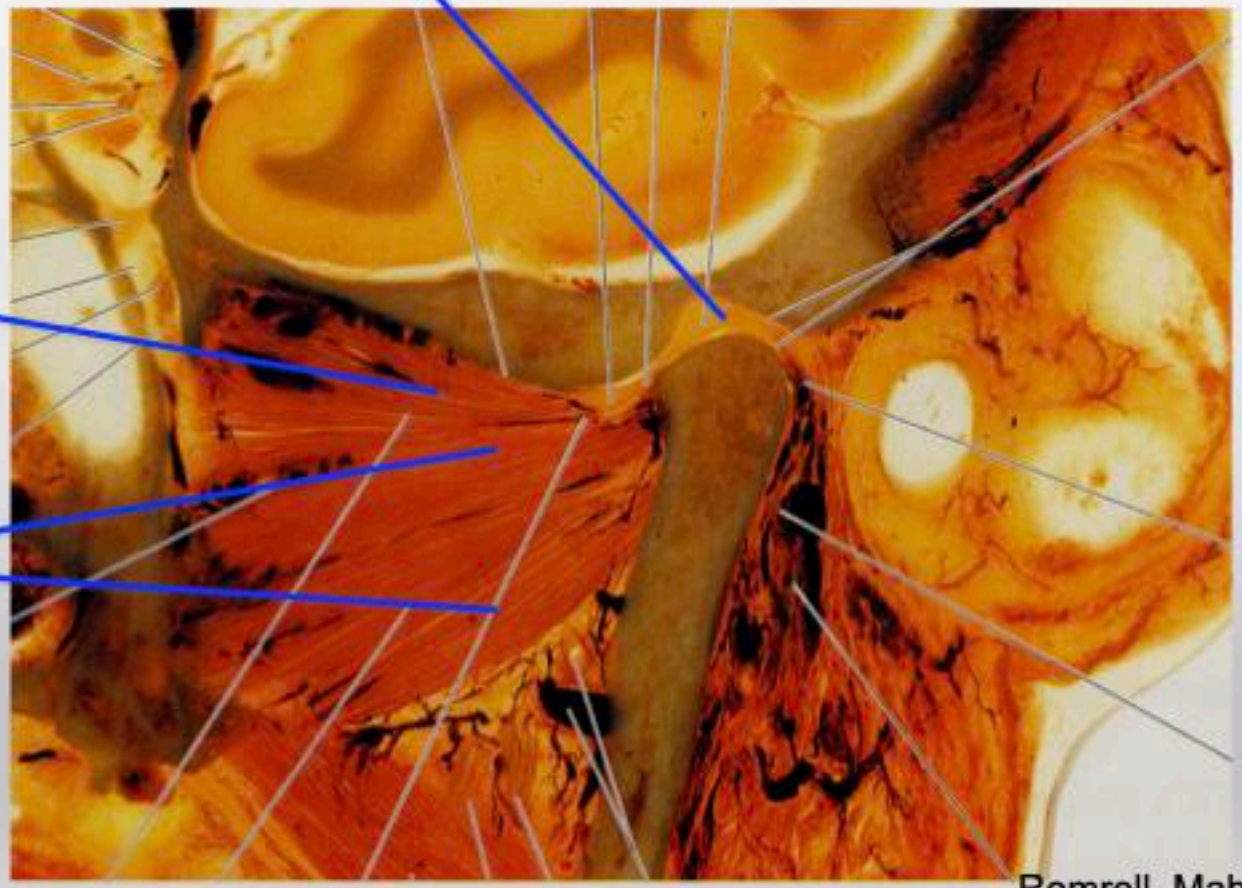
Upper- Translation
Lower- Rotation

Rotate
Slide
Pivot

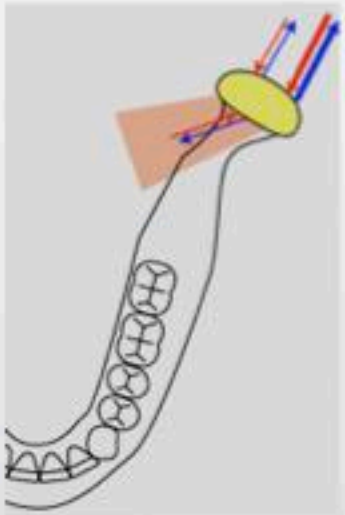
Solid end point closing
Ligamentous end point opening



Oblique Sagittal View



Axial View



Normal TMJ Blood Flow, Marrow

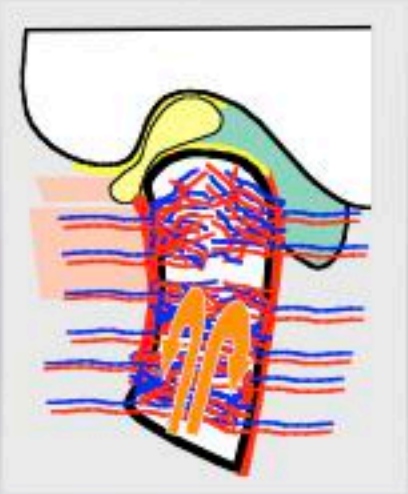
Condylar head limited collateral circulation

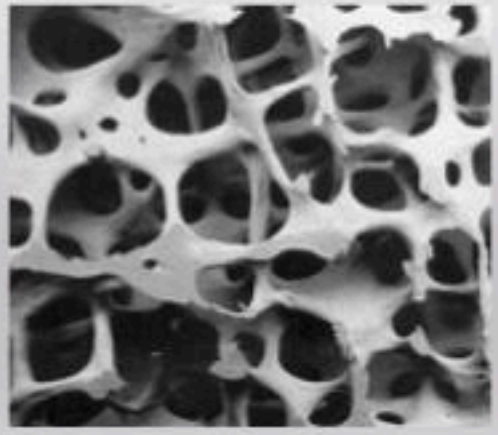
Epiphyseal growth center

Marrow is fatty tissue with blood vessels, containing the precursor for blood cells

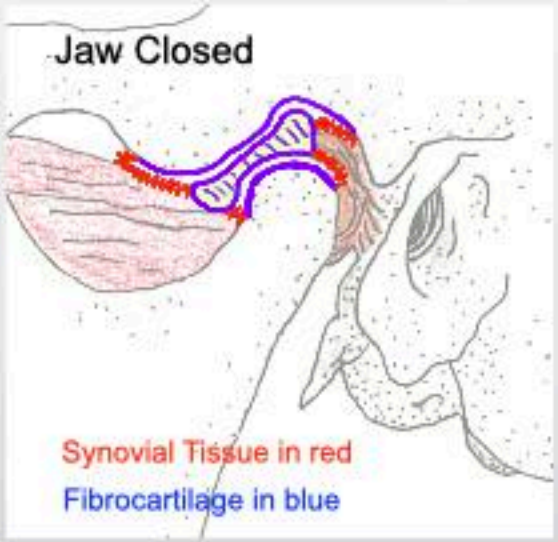
No Blood vessel inside joint

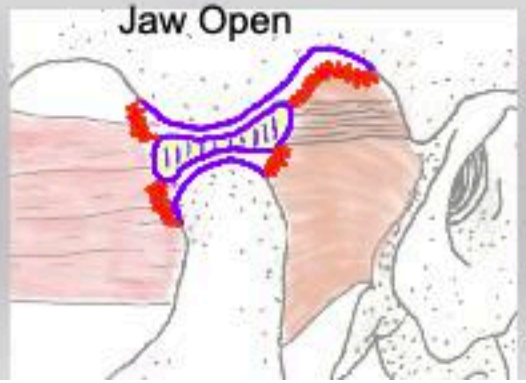
Closed Sagittal





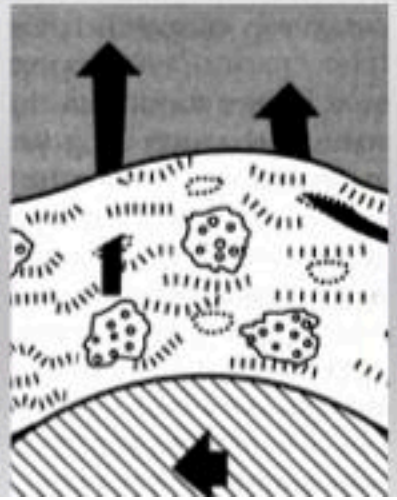
Normal TMJ- Synovium, Cartilage



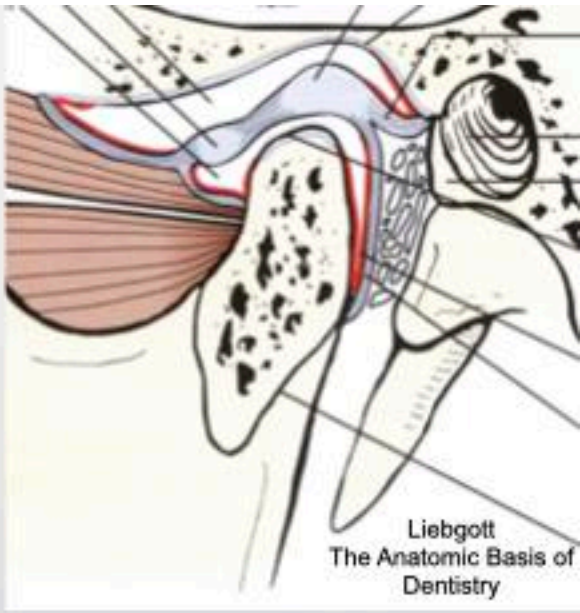


Fibrocartilage-
- Slope of Eminence
- Disc
- Top of Condyle

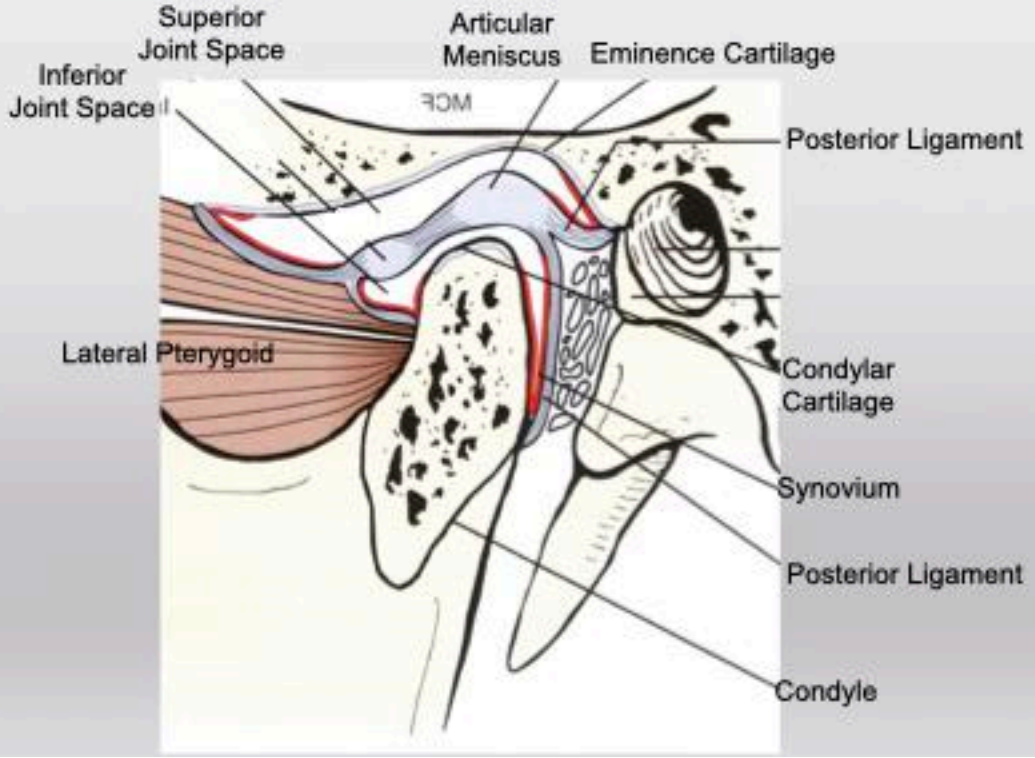
Synovial Tissue makes Synovial Fluid
- No blood vessels in a health joint
- Nutrition to the cartilage cells
- Lubrication- Hyaluronic Acid and Lubricin



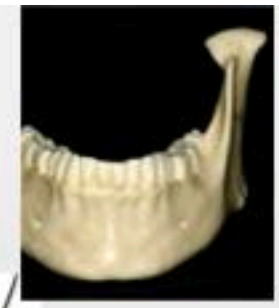
Fibrocartilage surface covered in fluid
- Cartilage is hydrophilic
- Proteoglycan negative charge
- Surface Active Phospholipids
- Fluid slides against fluid
- 5x slipperier than ice

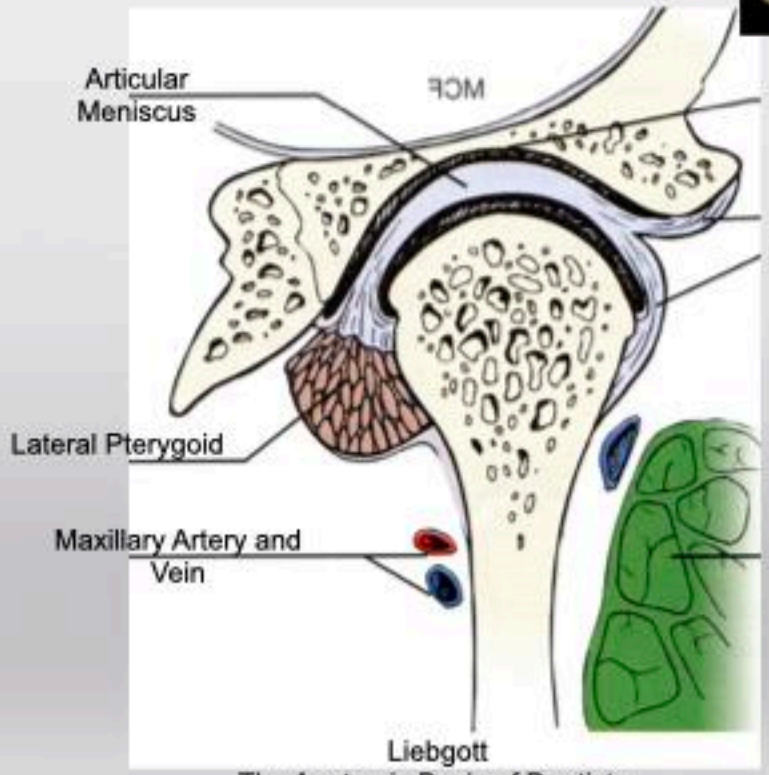


Left TMJ Sagittal View



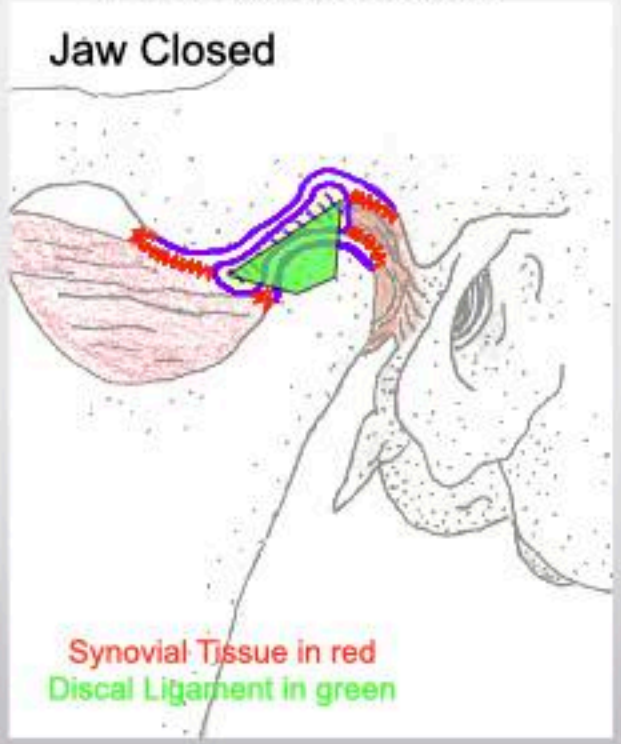
Left TMJ Coronal View





The Anatomic Basis of Dentistry

Normal TMJ



Discal Ligaments attach Disc to Condyle

Synovial Tissue
- Covers Front , Back and Sides
- Collapsed due to negative joint pressure

Disc viewed from above

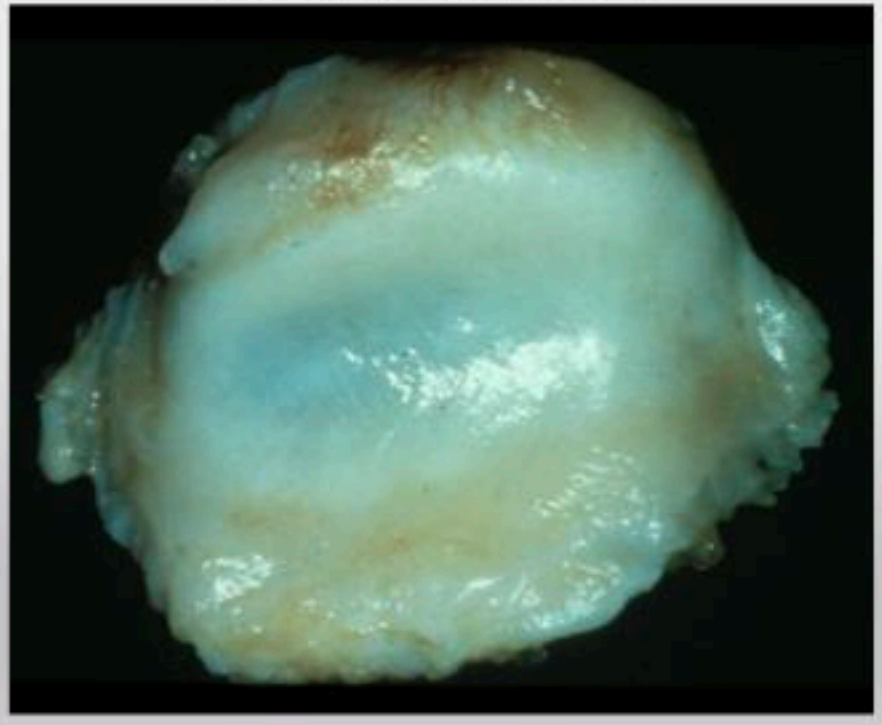
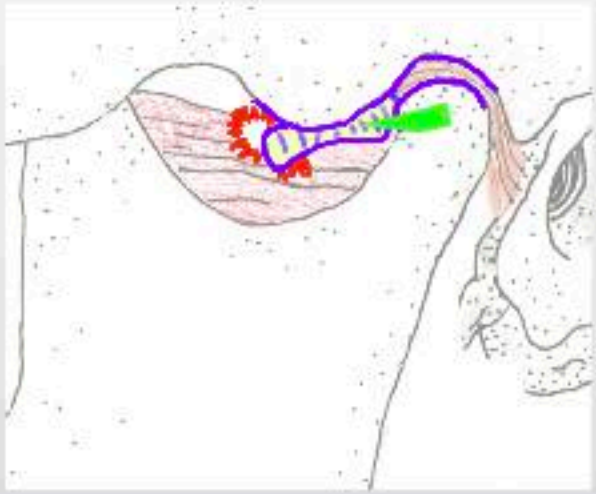


Photo Courtesy of Dr Henry Gremillion

Damaged TMJ- Anteriorly Dislocated Disc



Torn or stretched Meniscal ligaments

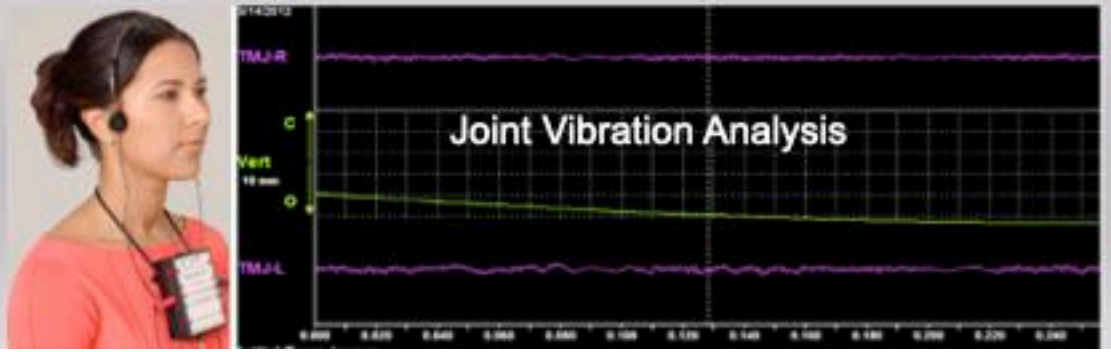
Anterior Dislocated Disc

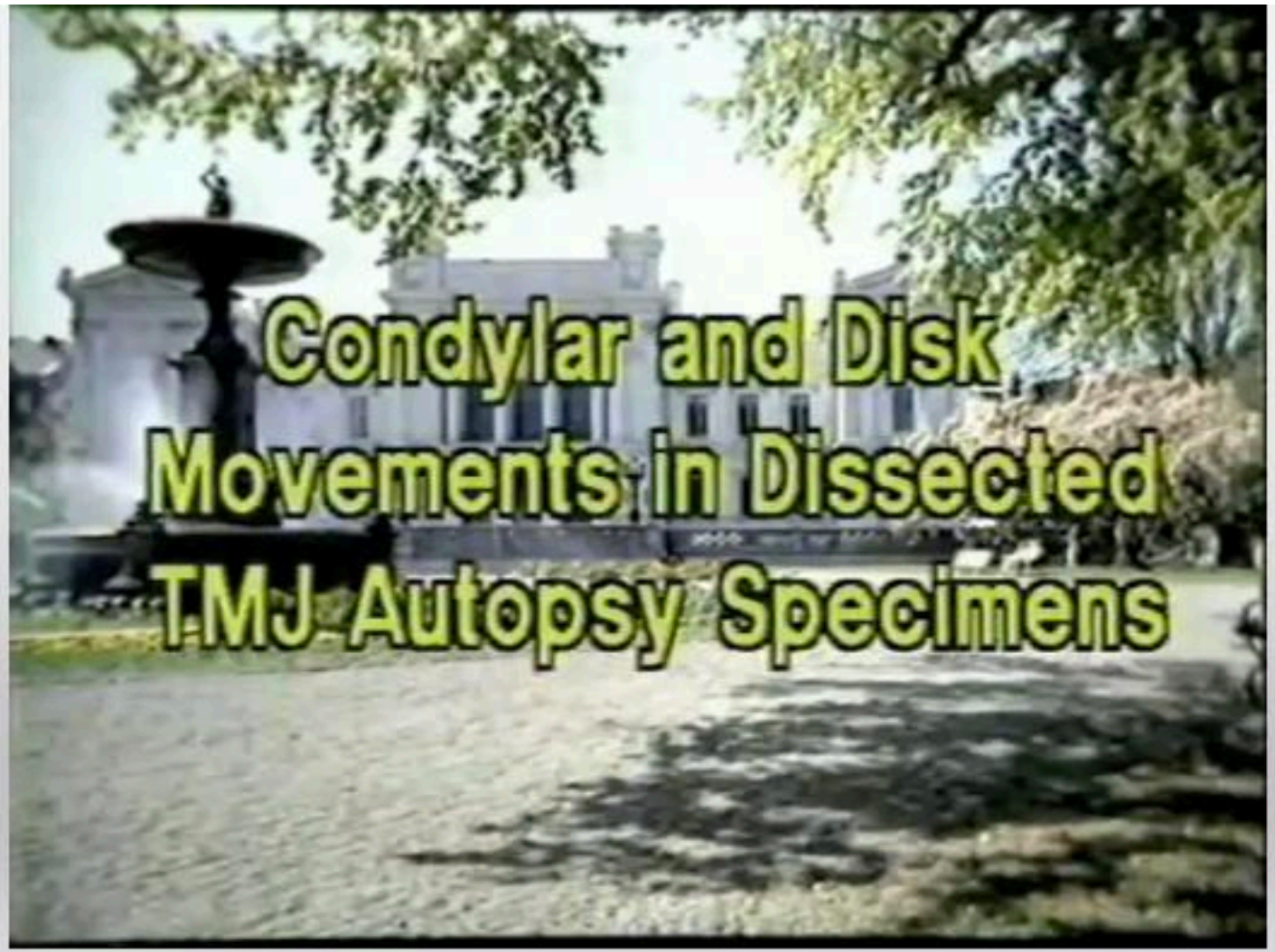
Damaged Synovium

Retrodiscal Tissue pulled up and over the condyle
- Retrodiscal tissue in direct contact with fibrocartilage
- Major Increase in friction
- Retrodiscal tissue adapts into fibrous "pseudodisc"

85% of all damaged joints adapt favorably without treatment

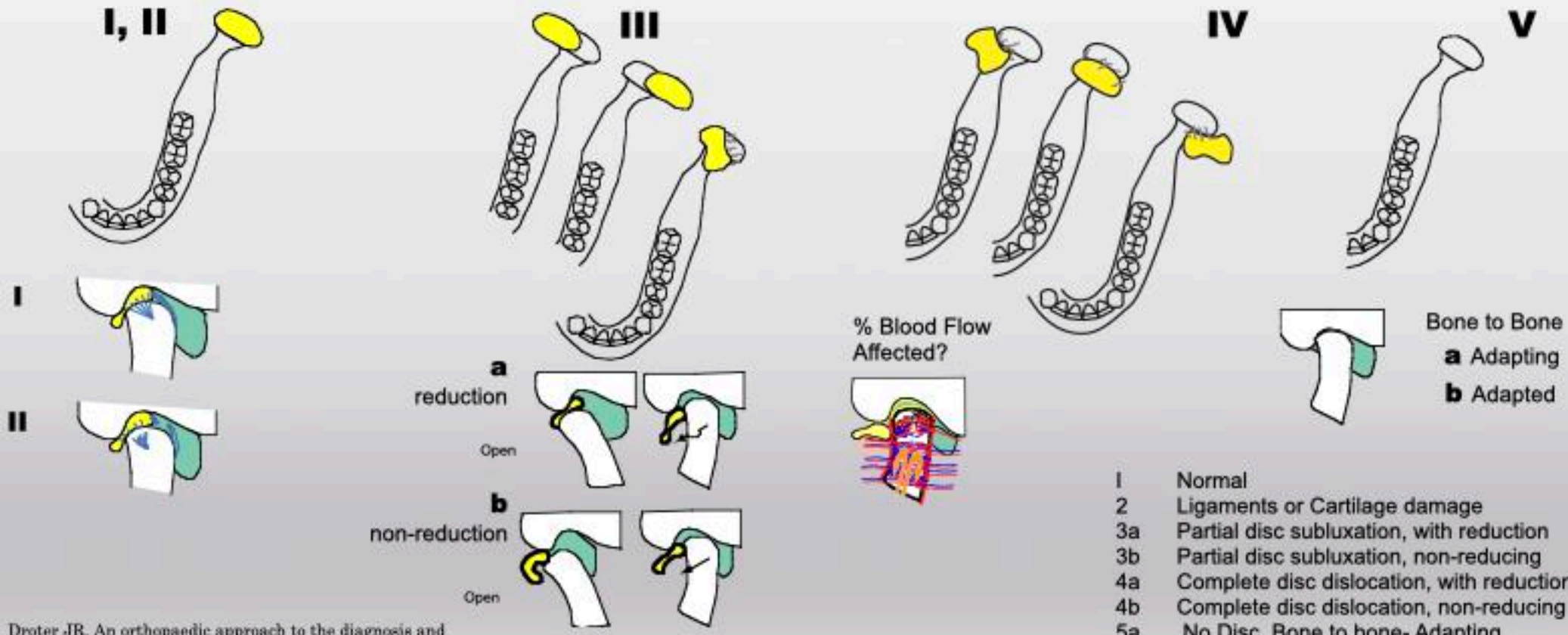
Cartilage sliding on tissue creates vibrations that can be detected




Condylar and Disk
Movements in Dissected
TMJ Autopsy Specimens

Dr. Mark Piper's Classification

Left TMJ

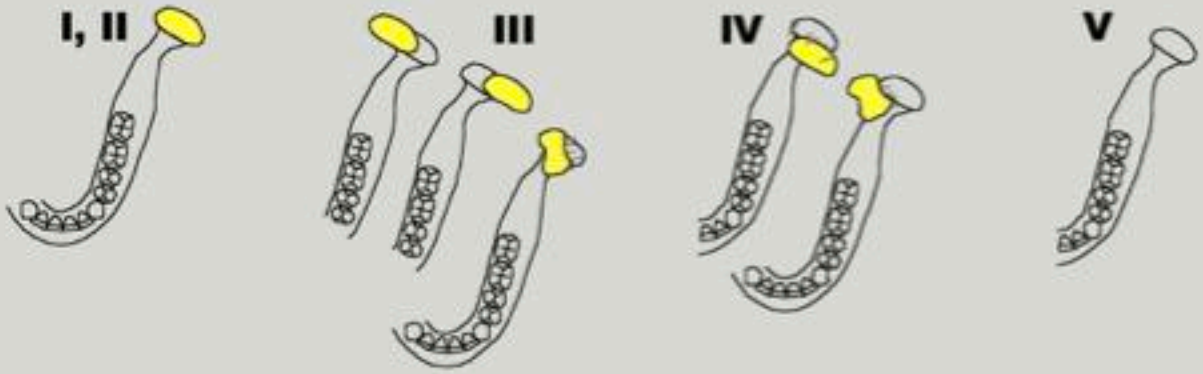


I	Normal
2	Ligaments or Cartilage damage
3a	Partial disc subluxation, with reduction
3b	Partial disc subluxation, non-reducing
4a	Complete disc dislocation, with reduction
4b	Complete disc dislocation, non-reducing
5a	No Disc, Bone to bone- Adapting
5b	No Disc, Bone to bone- Adapted

Droter JR, An orthopaedic approach to the diagnosis and treatment of disorders of the temporomandibular joint. Dent Today 2005 Nov;24(11):82, 84-8

Distribution- 126 MRIs- 252 TMJs

- Patients presenting to my Restorative/Pain practice
- All patients with <u>any</u> indication of TMJ damage had scans



I&II-	32%
IIIa-	12%
IIIb-	3%
IVa-	18%
IVb-	30%
V-	5%

I&II- 32%

Both joints normal 14%

IIIa- 12%
IIIb- <u>3%</u>
15%

IVa- 18%
IVb- <u>30%</u>
48%

V- 5%

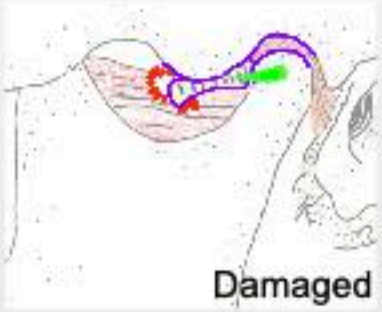
**III due mesial and III due lateral are new categories and not included in this study. Data thru 6/2003

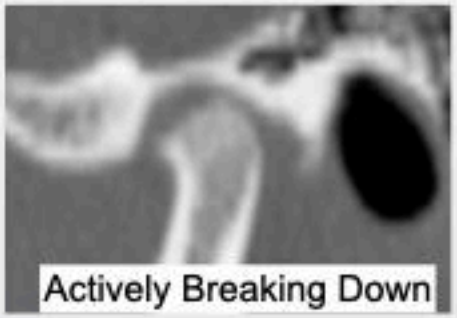
Basic Orthopedics

Joints are either
- Healthy or
- Damaged

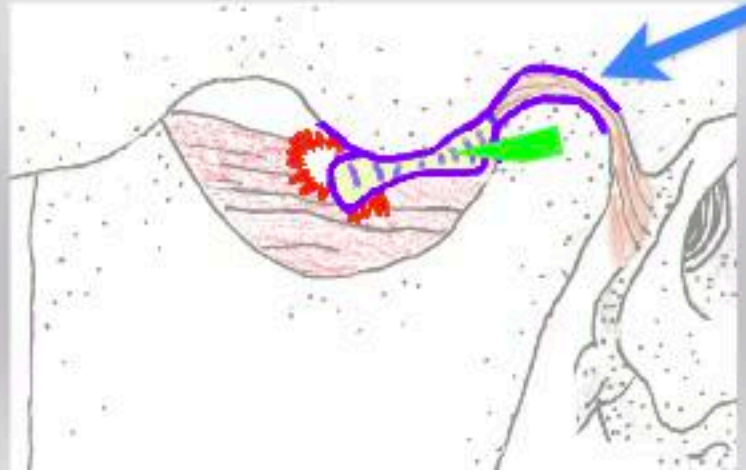
If damaged, joints will be either:
- Actively Breaking Down
- Adapting
- Adapted
  - Structurally, Mechanically
  - Favorably, Unfavorably


Healthy


Damaged


Actively Breaking Down

Majority of damaged TMJs adapt favorably



Posterior ligament, synovium, and retrodiscal tissue adapt to form a

Pseudo-disc

Tissue Fibrosis

Differential Diagnosis: Limited Joint Motion

Muscle Spasm

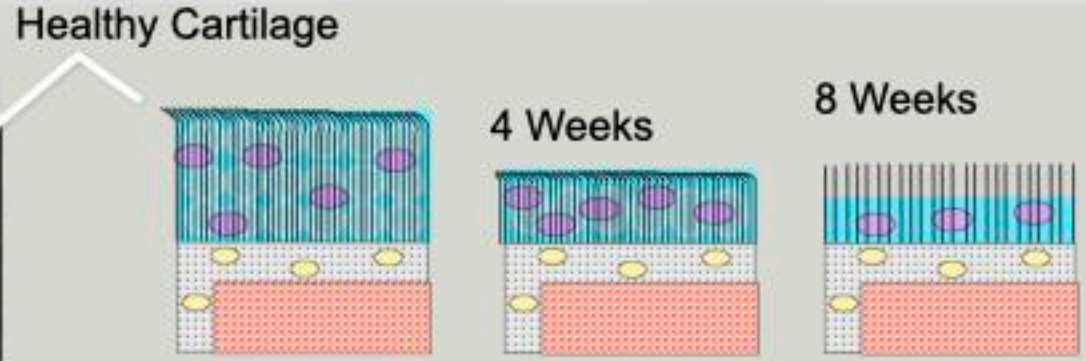
Painful to Move
- Joint Pain
- Muscle Pain

Mechanically Blocked
- 4b Acute
- Adhesion

Masseteric Space
- Infection
- Hematoma

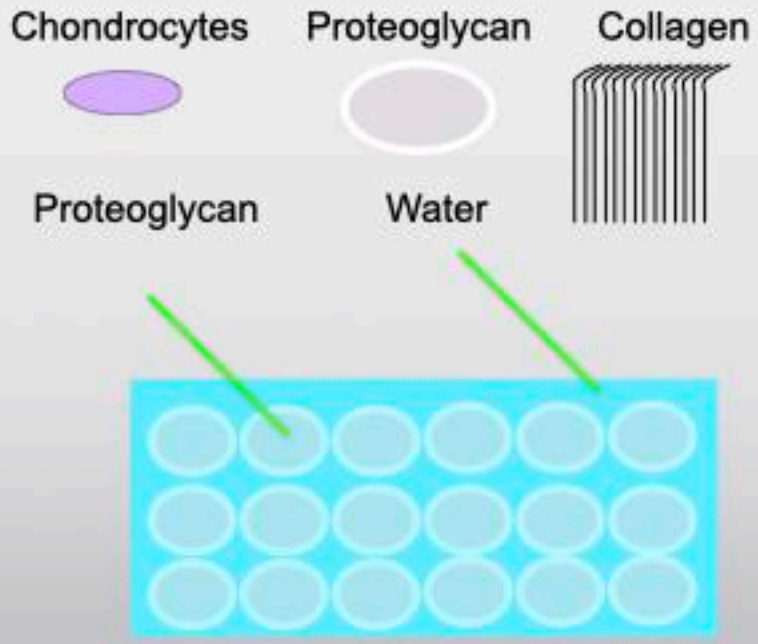
Lose 50% height of cartilage
Proteoglycans not being produced by Chondrocytes
Loss of 50% proteoglycans and water
Collagen still intact
Process is reversible
Move joint with light force/repetitive motion next 30 days

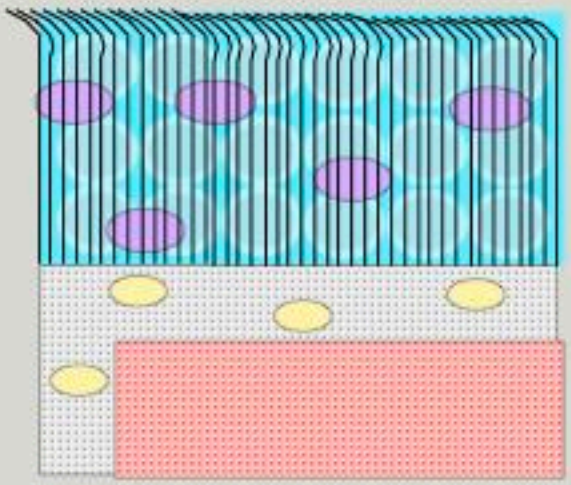
You have 6-8 weeks to get jaw moving before cartilage is irreversibly damaged, independent of the cause of the immobilization



E.B. Evans, GWN Eggers, J.K. Butler, and J. Blumel, Experimental immobilization and remobilization of rat knee joints, J Bone Joint Surg Am, 1960 vol. 42 (5) pp. 737-758
Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717

Healthy Cartilage





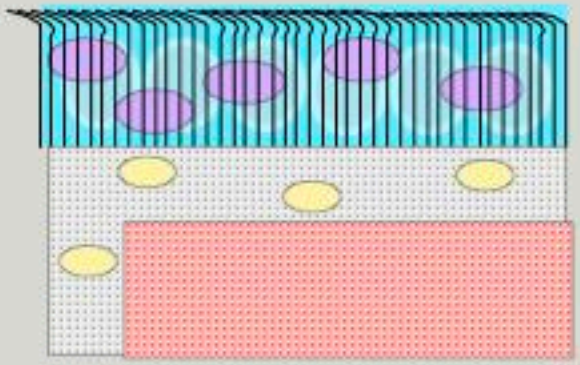
Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717

Immobilization 4 weeks

Proteoglycans not being produced by Chondrocytes
Collagen still intact
Process is reversible at 4 weeks
Move joint with light force/repetitive motion next 30 days

Half as many "Balloons"
Still have "Ropes"

Half as many proteoglycans so
half as much water so
half as much cartilage height



Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717

Immobilization 8 weeks

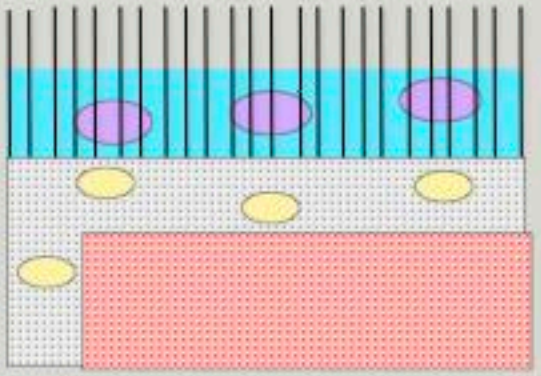
"Ropes" Degenerate

Permanent joint damage in previous healthy joints

The cartilage is irreversible damaged
- Collagen is irreversible damaged.
- The proteoglycans have no way to attach in the cartilage matrix

Adhesions form between the joint surfaces
Connective tissue proliferates into the joint
Fibrous contracture of the muscles and joint capsule

Key Point:
In a patient with limited opening, you have 4 weeks to get the jaw moving.
At 8 weeks, there is permanent damage to the TMJ, even if it was not the original cause of the limited opening



Differential Diagnosis: Limited Joint Motion

Muscle Spasm

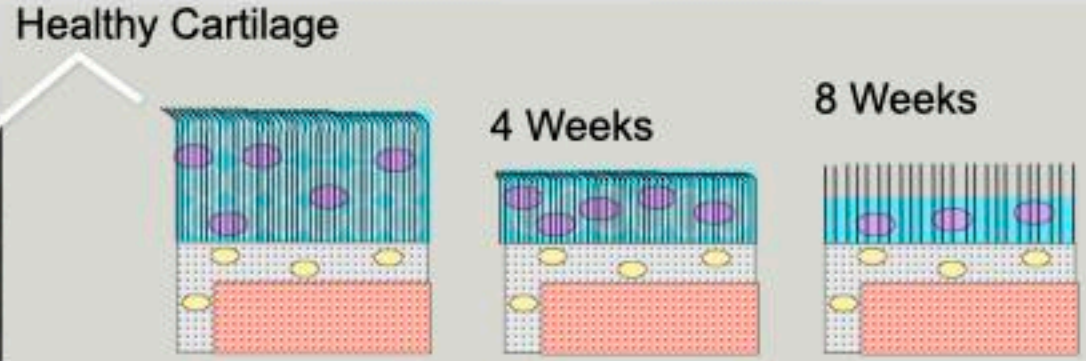
Painful to Move
- Joint Pain
- Muscle Pain

Mechanically Blocked
- 4b Acute
- Adhesion

Masseteric Space
- Infection
- Hematoma

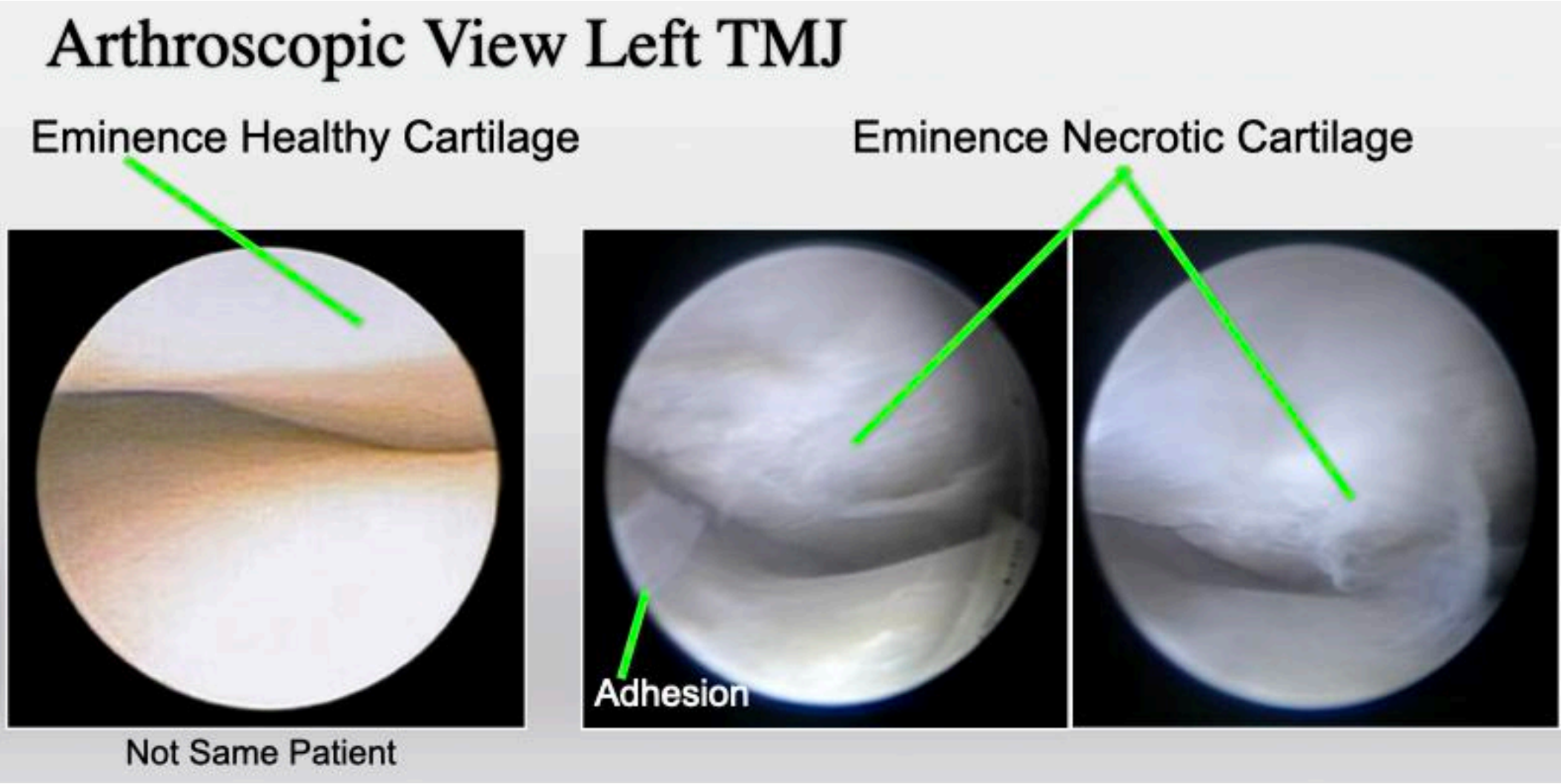
Lose 50% height of cartilage
Proteoglycans not being produced by Chondrocytes
Loss of 50% proteoglycans and water
Collagen still intact
Process is reversible
Move joint with light force/repetitive motion next 30 days

You have 6-8 weeks to get jaw moving before cartilage is irreversibly damaged, independent of the cause of the immobilization



E.B. Evans, GWN Eggers, J.K. Butler, and J. Blumel, Experimental immobilization and remobilization of rat knee joints, J Bone Joint Surg Am, 1960 vol. 42 (5) pp. 737-758
Enneking WF, Horowitz M. The intra-articular effects of immobilization on the human knee. J Bone Joint Surg Am. 1972 Jul;54(5):973-85. PMID: 5068717

Arthroscopic View Left TMJ



Right TMJ

Open Joint Surgery

Cartilage Damage Movie

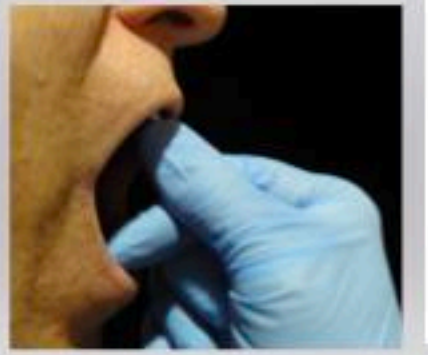
Limited Opening Algorithm

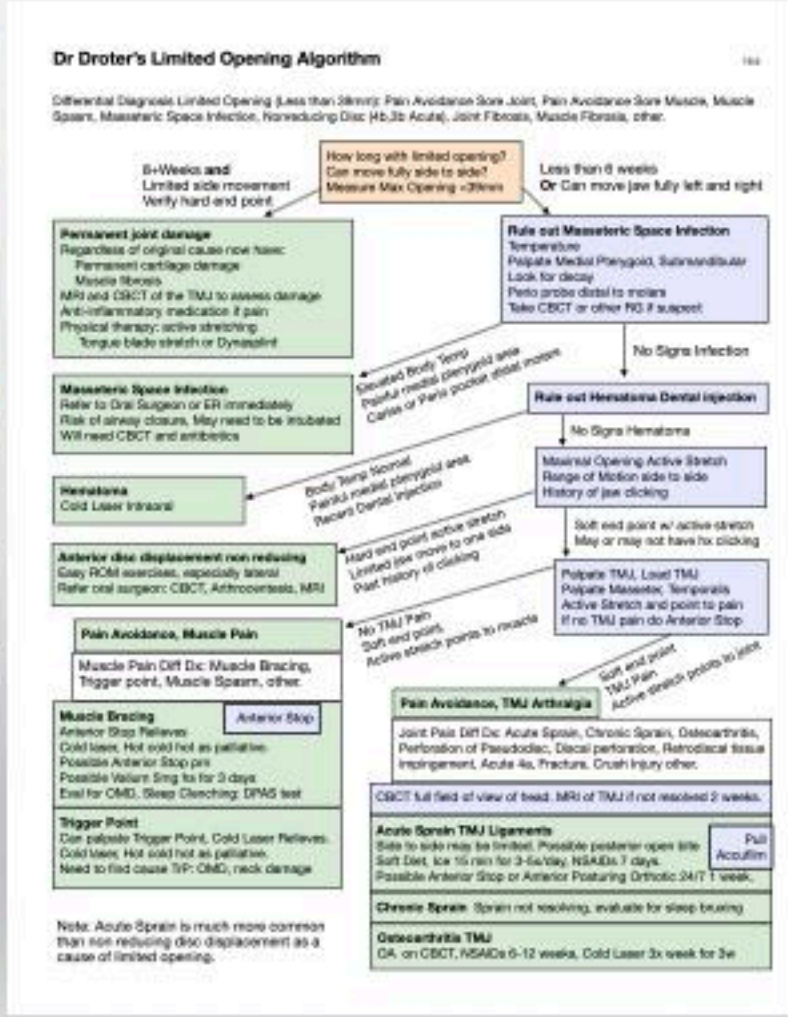
Differential Diagnosis Limited Opening:

- Pain Avoidance Sore Joint
- Pain Avoidance Sore Muscle
- Hematoma
- Muscle Spasm
- Masseteric Space Infection
- Nonreducing Disc (4b,3b Acute)
- Joint Fibrosis, Muscle Fibrosis
- Other

Diagnostic Tests:

- History: How long limited
- Body Temperature
- Caries Exam, Perio exam
- ROM open, side to side
- Gentle Active stretch
  - Point to area of pain
- Anterior Stop
- If needed CBCT, MRI





Subjective:

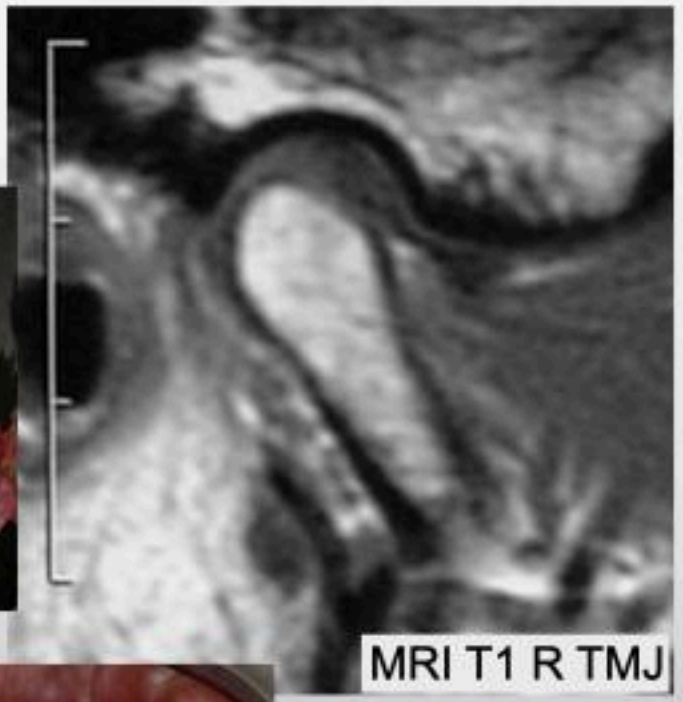
- Dentist doing crown prep #30 1 week ago
- Severe pain Right TMJ after moving jaw at end of appt
- Constant deep pain Right TMJ
- Limited opening

Objective:

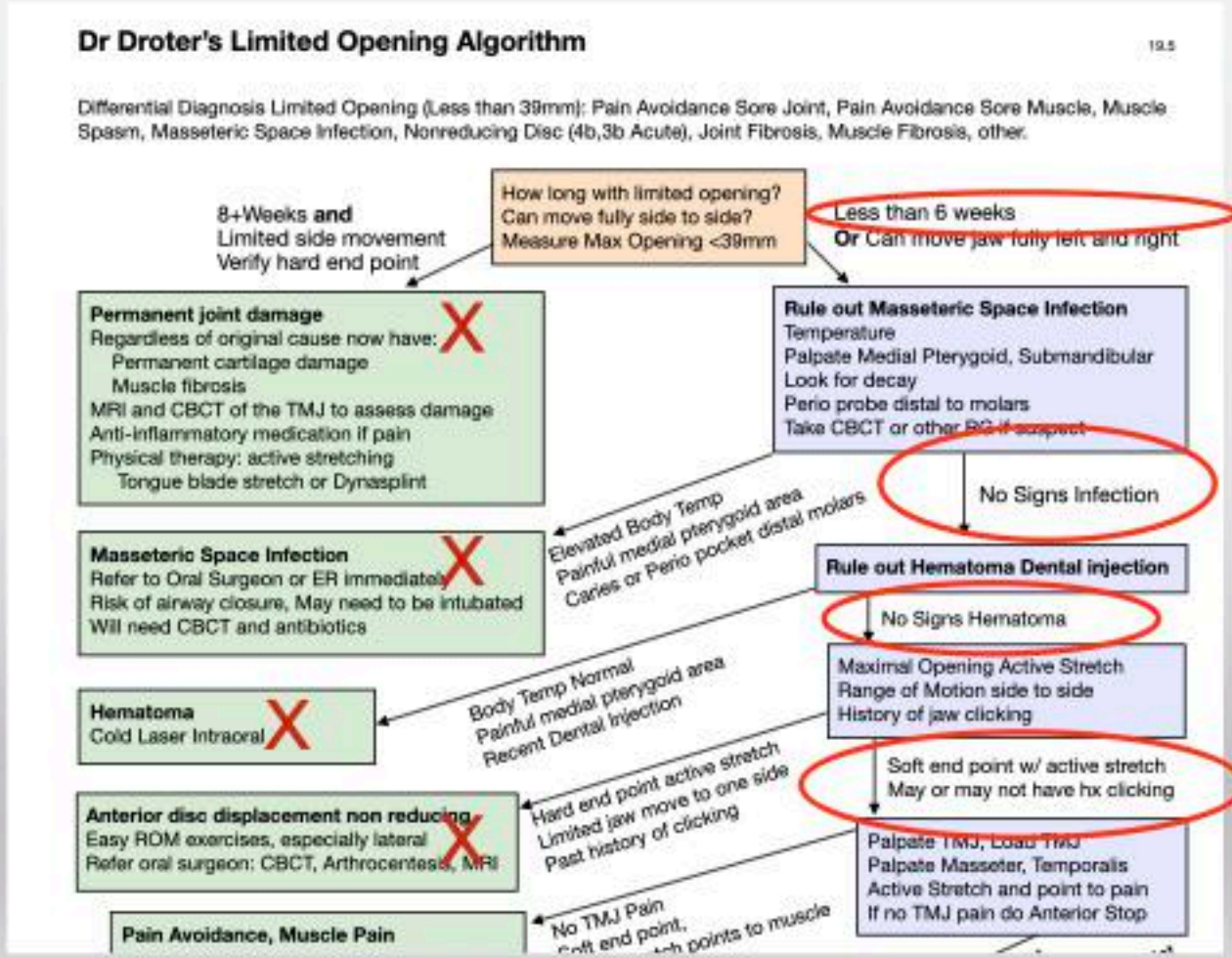
- Limited opening 32mm, Mandible shifts Left
- Normal side to side motion
- 98 temp, normal perio probe 2nd molars, no caries
- No pain palpation RL Medial Pterygoid
- Soft end point on active stretch, 45mm, R TMJ pain
- Right TMJ pain to palpation, Left TMJ normal
- Posterior openbite Right, does not hold Accufilm

Assessment:

- Limited opening due to Right TMJ pain avoidance
- Acute Sprain Right TMJ Ligaments



MRI T1 R TMJ



Objective:

Limited opening 32mm, Mandible shifts Left

Normal side to side motion

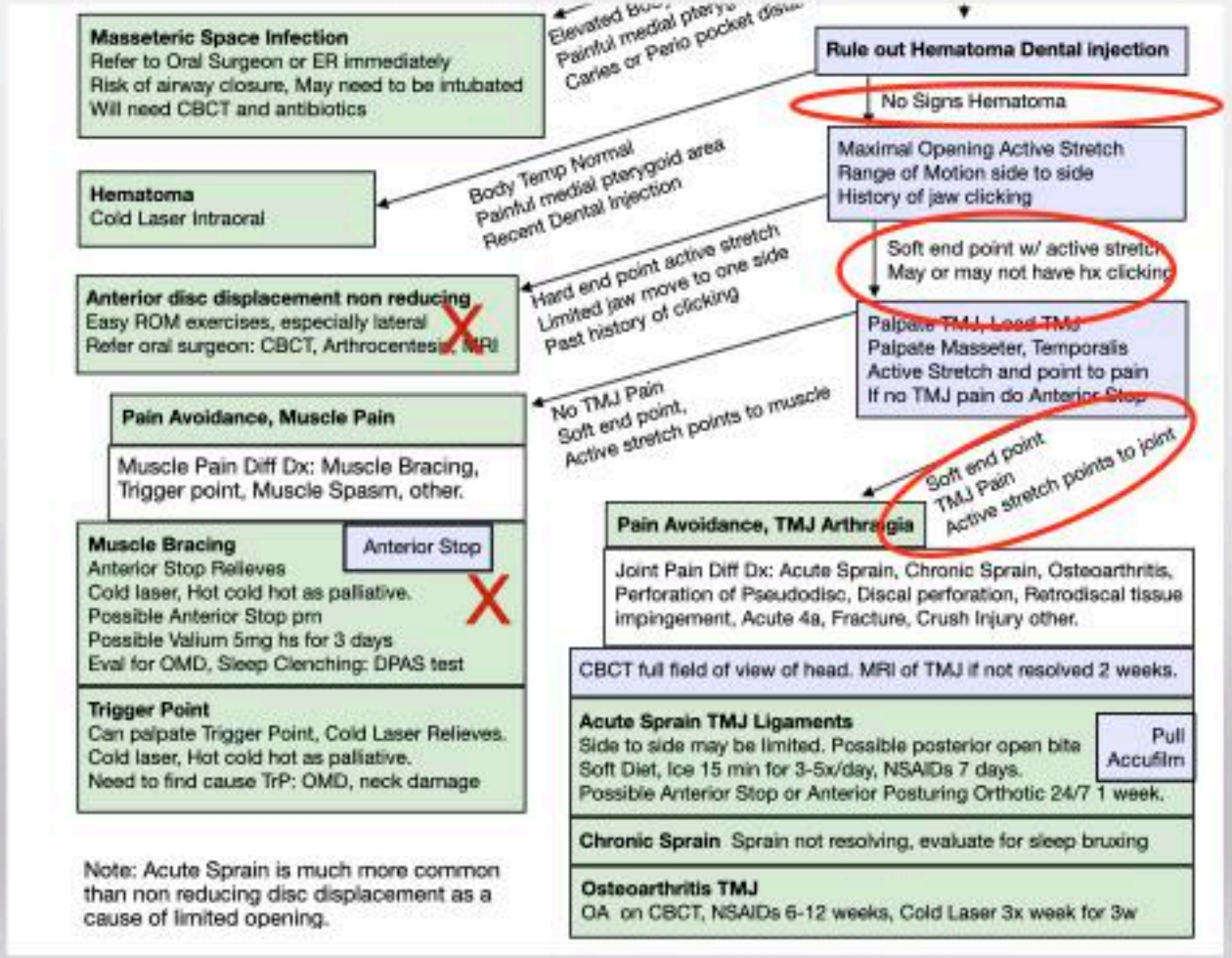
98 temp, normal perio probe 2nd molars, no caries

No pain palpation RL Medial Pterygoid

Soft end point on active stretch, 45mm, R TMJ pain

Right TMJ pain to palpation, Left TMJ normal

Posterior openbite Right, does not hold Accufilm



Objective:

Limited opening 32mm, Mandible shifts Left

Normal side to side motion

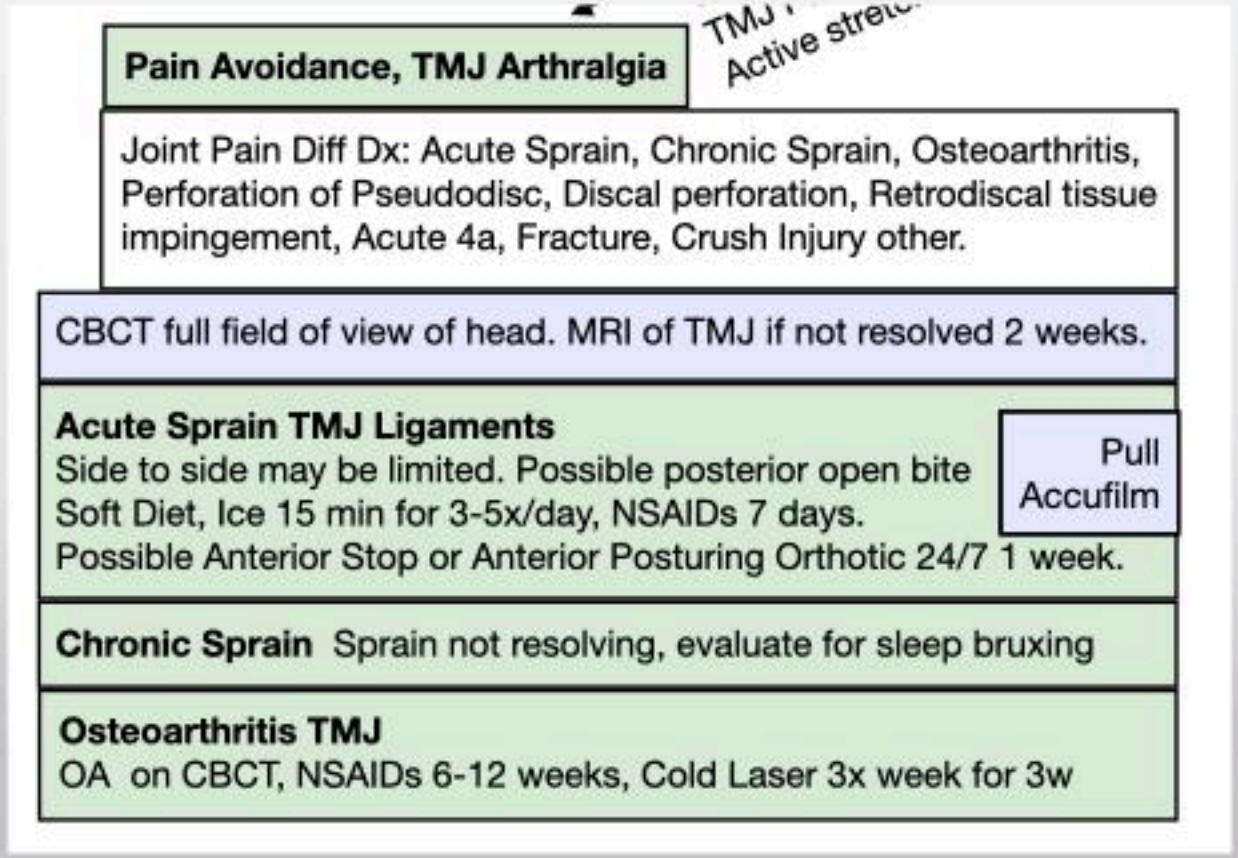
98 temp, normal perio probe 2nd molars, no caries

No pain palpation RL Medial Pterygoid

Soft end point on active stretch, 45mm, R TMJ pain

Right TMJ pain to palpation, Left TMJ normal

Posterior openbite Right, does not hold Accufilm



Objective:

Limited opening 32mm, Mandible shifts Left

Normal side to side motion

98 temp, normal perio probe 2nd molars, no caries

No pain palpation RL Medial Pterygoid

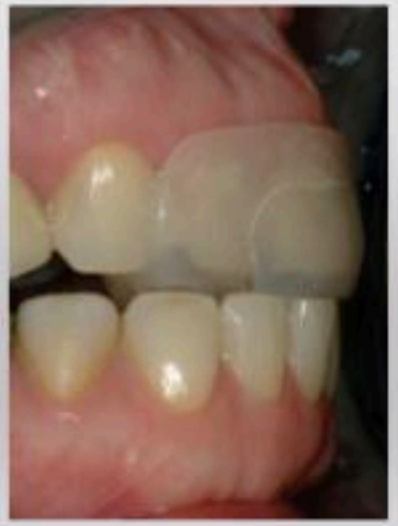
Soft end point on active stretch, 45mm, R TMJ pain

Right TMJ pain to palpation, Left TMJ normal

Posterior openbite Right, does not hold Accufilm

Treatment:
Ice 15-20 minutes for 3-5x 2 days only
Anterior repositioning orthotic 24/7 one week
NSAID for 5 days- 800mg Advil Liquid gel caps, q8h
Sleep with head elevated first week
Soft chew diet
At 1 week Anterior repositioning orthotic sleep only for second week
Week 3, no orthotic, reintroduce harder foods

Verify Orthotic does not rub lingual tissue of mandible



At 4 weeks patient had full ROM
No clicking

New addition to protocol
Cold Laser (MLS Laser- 1500 hz 15 seconds, 10 hz 30 seconds)

MLS Laser

Multiwave Locked System Laser

808 nm Continuous, 905 nm Pulsed

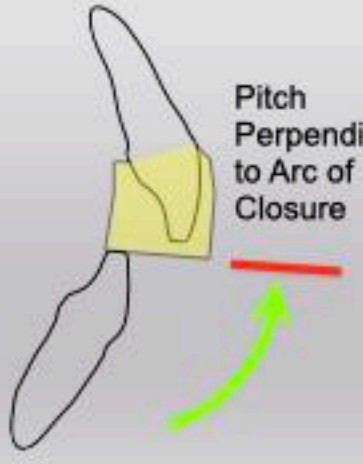
Stimulates metabolic processes in cells
Decrease inflammation
Pain Reduction
Faster Healing

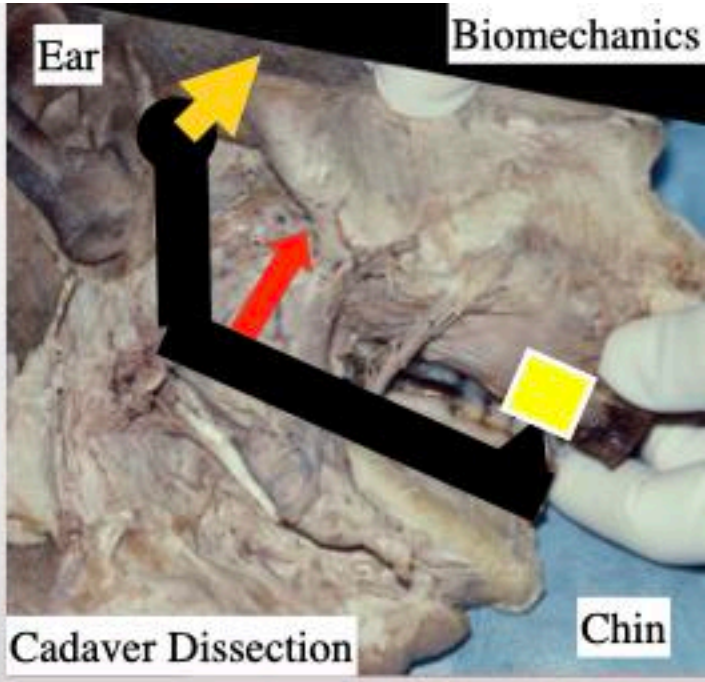
Diode Laser

Ms MY

Anterior Stop Orthotic 3 Effects

1. Allows Maxilla, Mandible, and Temporal bones to align.
2. Major decrease in muscle contraction force, most patients.
3. Breaks muscle engram avoidance and bracing patterns.





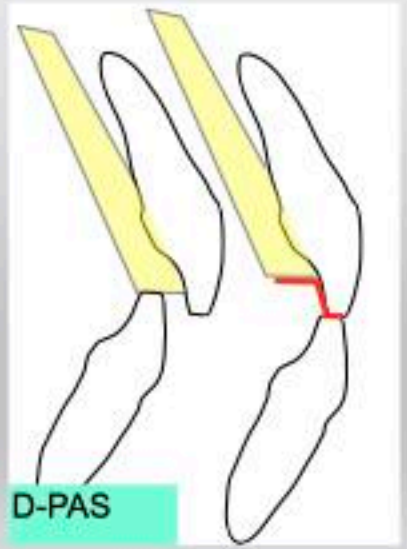
Facial Pain Diagnosis

Diagnostic Tools

1 Written and Oral History
2 Observation
3 Physical Exam
- Muscle Palpation
- Joint Palpation
- Joint Auscultation
- Joint Motion

4 **Anterior Stop Test**
5 Sleep Airway Screening
6 CT Scan
- MRI
- Blood Tests

Short



Anterior Stop Orthotics Utilization

- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

Palatal Anterior Stop

APS In Office Anterior Stop

APS Home Trial
Temporary Anterior Stop

***Do not send patient home with small anterior stops that can be aspirated.

Anterior Stop Orthotics

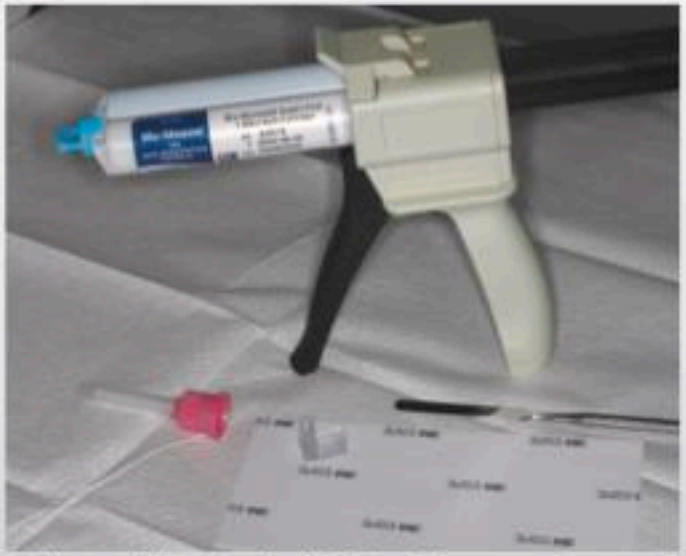
- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

APS In Office
Anterior Stop
2.5 mm

Pankey In Office
Anterior Stop

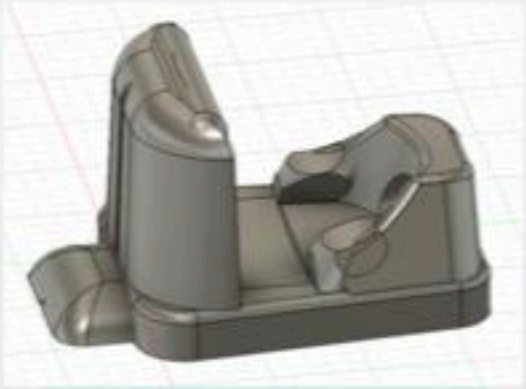
***Do not send patient home with small anterior stops that can be aspirated.

Anterior Stop Orthotic
In Office Diagnostic Test



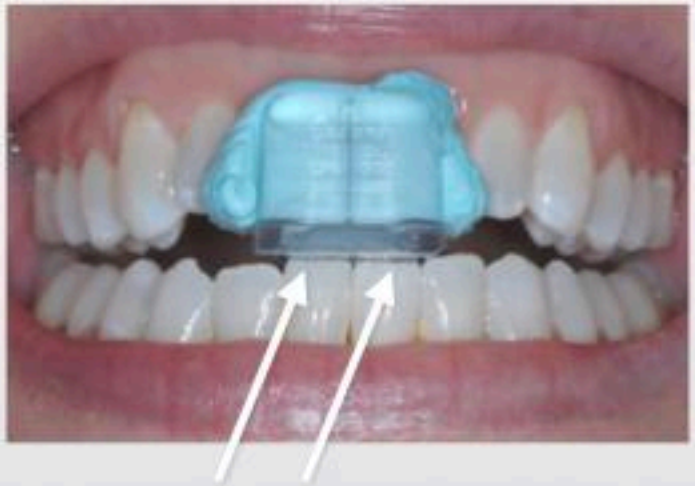
Reline with Parkell Blu-Mousse Super Fast

Can do 2nd reline over
top of the first if needed



APS Anterior Stop 2.5mm

Easy to hold and align
Built in undercuts
Long enough for class 2 and class 3
Is bondable to composite

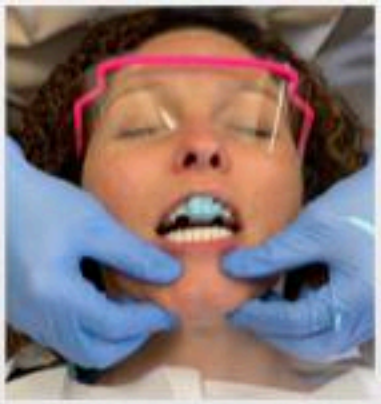


2 points of contact

Pitch Perpendicular
to Arc of Closure

Anterior Stop Orthotic In Office Diagnostic Test

ArrowPath Sleep
Anterior Stop



Deprogram Muscle Engrams

If pain reduces, Occlusion/ Cranial Alignment and/or Muscle Engrams are part of the problem

<u>With anterior stop in place:</u>

5-10x wide open solid tap, open tap far left, open tap far right

2nd round same except Dr unexpectedly accelerates closing a few times

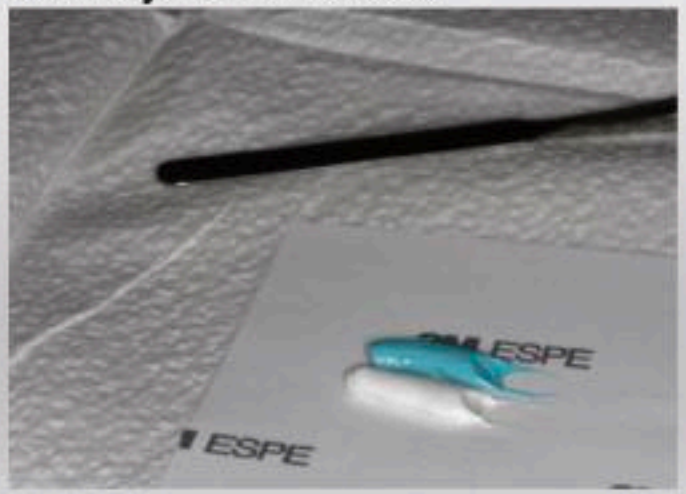
Occipital Lift with 3 deep breaths. Posterior neck opening muscle massage.

3rd round same as first except less taps each position

Office USE ONLY Do not send home with patient

Anterior Stop Orthotic
In Office Diagnostic Test

Can do 2nd mix to
overlay 1st if needed



Anterior Stop Orthotic
In Office Diagnostic Test

Does the occlusion, cranial alignment, and/ or muscle bracing have anything to do with the dysfunction or pain?

Are the TMJ muscles inhibited from full contraction with anterior only tooth contact?

ArrowPath Sleep
Anterior stop 2.5 mm

>30% of headaches have an occlusal component

Occlusal adjustment in patients with craniomandibular disorders including headaches. A 3- and 6-month follow-up. Vallon D, Ekberg E, Nilner M. Acta Odontol Scand. 1995

Response to occlusal treatment in headache patients previously treated by mock occlusal adjustment. Forssell H, Kirveskari P, Kangasniemi P. Acta Odontol Scand. 1987

19 yo F Limited opening for past year 30-2 mm

Not able to eat solid foods for past 6 months and scheduled for TMJ surgery next month

Anterior stop placed:

5 minutes of jaw manipulation

Pain level went from 8/10 to 0

Opening went from 30-2 to 48-3

Pankey Anterior Stop
relined with bis-gma resin

Working Diagnosis:

Protective Muscle Bracing
Occlusal Muscle Dysfunction
Anterior Openbite

Anterior Stops

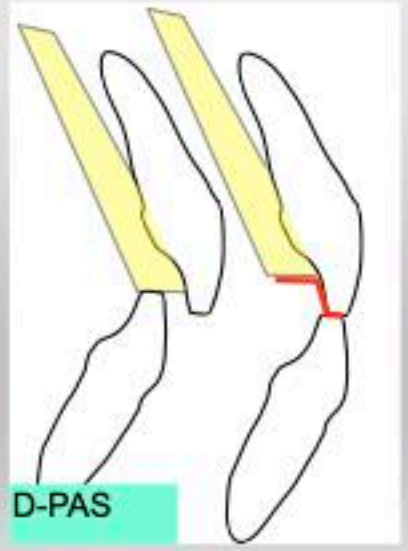
John R Droter DDS
Annapolis, Maryland

Detailed

Facial Pain Diagnosis

Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. **Anterior Stop Test**
5. Sleep Airway Screening
6. CT Scan
   MRI
   Blood Tests

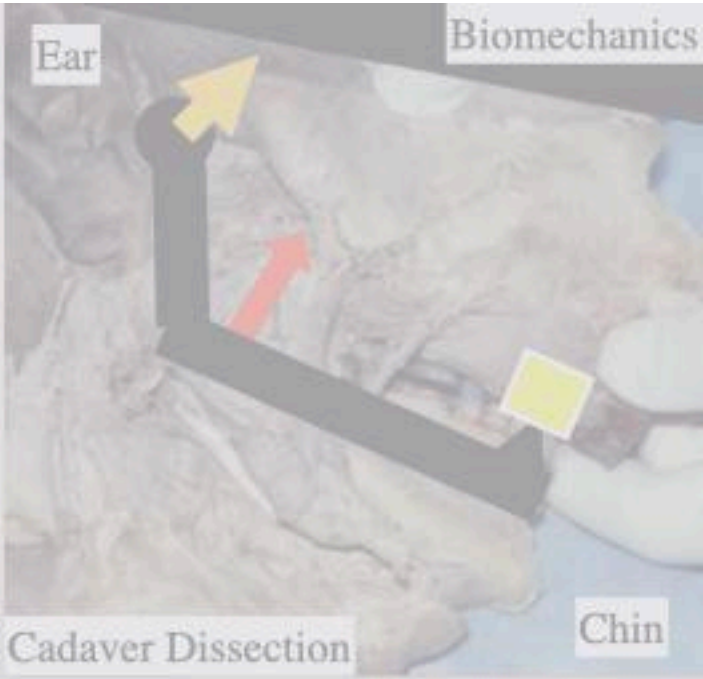


Anterior Stop Orthotics

APS
ArrowPath Sleep

Anterior Stop Orthotic 3 Effects

1. Allows Maxilla, Mandible, and Temporal bones to align.
2. Major decrease in muscle contraction force, most patients.
3. Breaks muscle engram avoidance and bracing patterns.

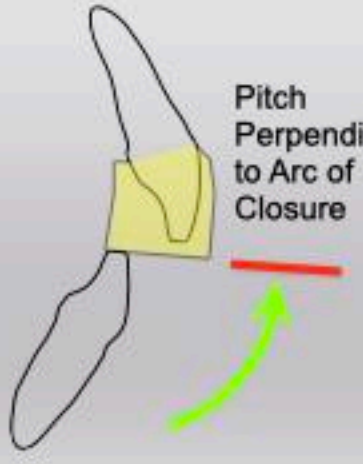


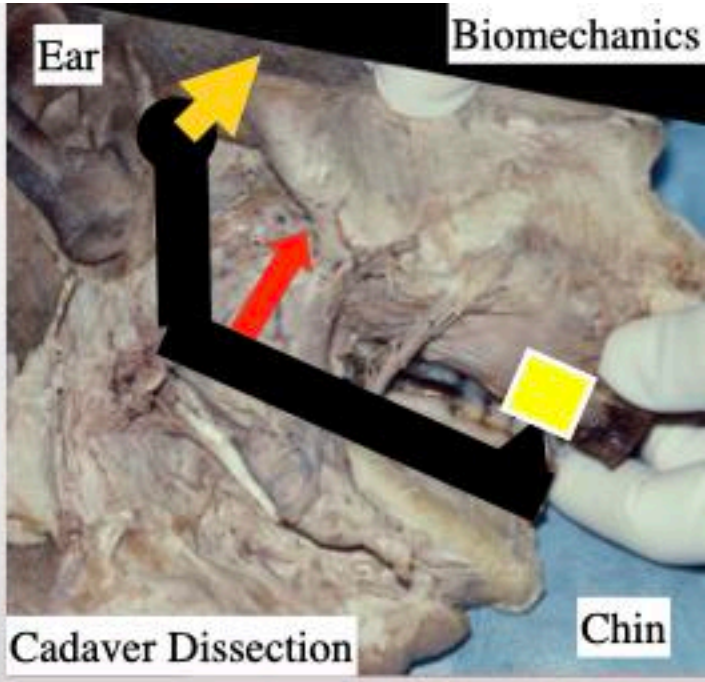
	µV	µV
TA-R	100.6	15.7
TA-L	108.9	25.3
MM-R	115.4	25.5
MM-L	70.5	6.8

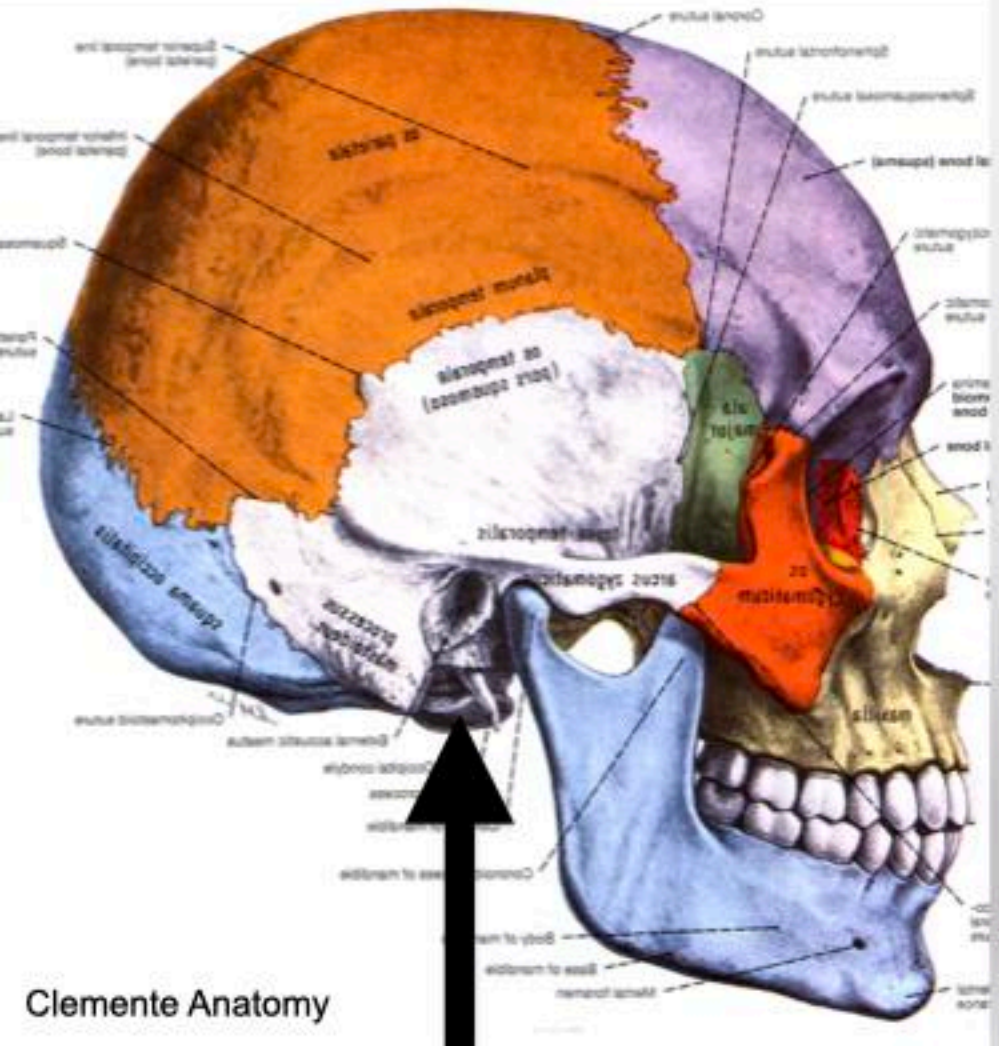
Major decrease in muscle power with D-PAS

Anterior Stop Orthotic 3 Effects

1. Allows Maxilla, Mandible, and Temporal bones to align.
2. Major decrease in muscle contraction force, most patients.
3. Breaks muscle engram avoidance and bracing patterns.

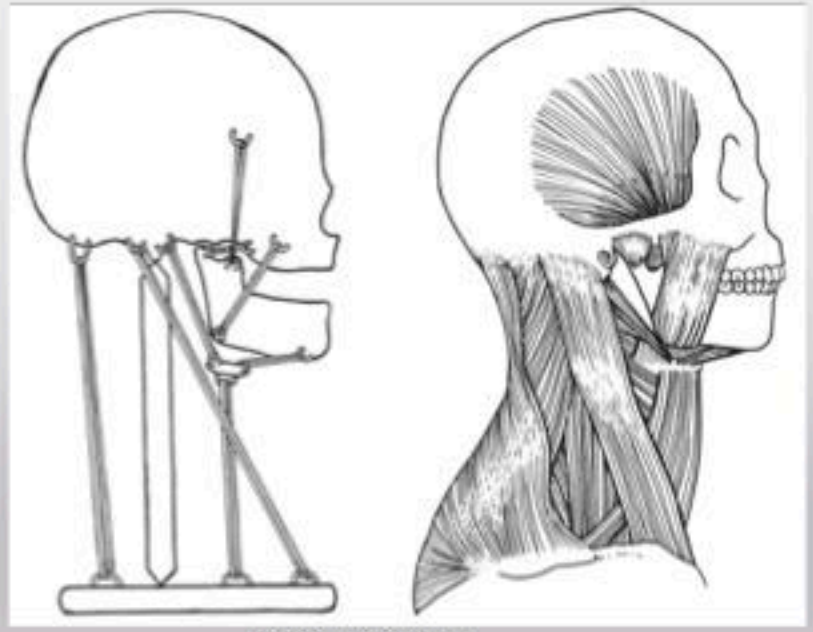






Clemente Anatomy

There is no way the skull is one solid piece that dies not flex.



Jeffery Okeson
Temporomandibular Disorders and Occlusion

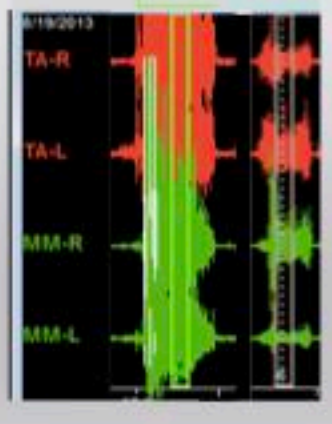
Anterior Stop Orthotic 3 Effects

1. Allows Maxilla, Mandible, and Temporal bones to align.
2. Major decrease in muscle contraction force, most patients.
3. Breaks muscle engram avoidance and bracing patterns.

BioResearch EMG

Patient with muscles inhibited by anterior only contact

	Clench MaxIC μV	Anterior Stop D-PAS μV
TA-R	100.6	15.7
TA-L	108.9	25.3
MM-R	115.4	25.5
MM-L	70.5	6.8



Major decrease in muscle power with D-PAS

Another Patient with muscles NOT inhibited by anterior only contact

	Clench MaxIC μV	Anterior Stop D-PAS μV
TA-R	82.2	77.9
TA-L	124.6	103.6
MM-R	185.0	169.0
MM-L	79.9	86.6

Muscle power same with D-PAS

Anterior Stop Orthotic 3 Effects

1. Allows Maxilla, Mandible, and Temporal bones to align.
2. Major decrease in muscle contraction force, most patients.
3. Breaks muscle motor engram avoidance and bracing patterns.

Mikaela Shiffrin
World Championships 2021

Jaw and Neck

Motor Engrams: Muscle Contracture Patterns

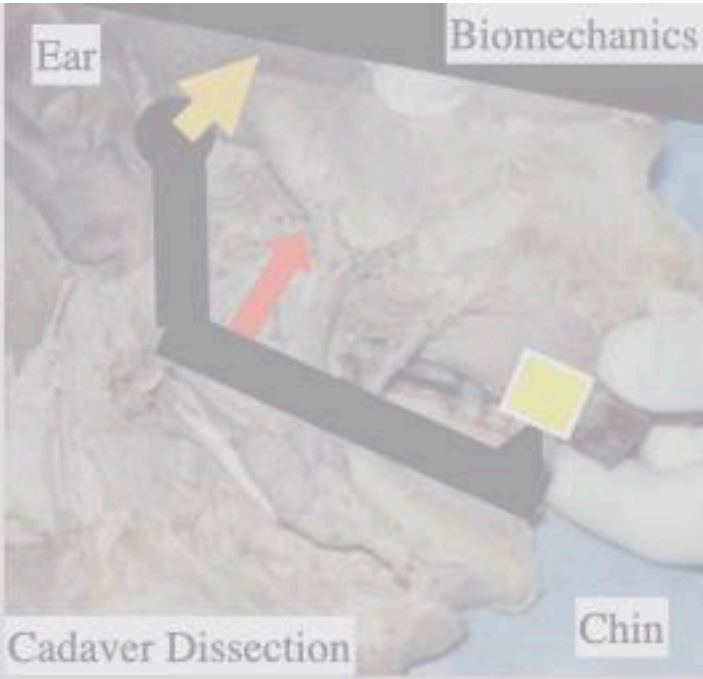
- Functional (to varying degrees)
- Protective: Pain Avoidance
- Protective: Bracing Stabilization of Joint

Monfils, M. H. In Search of the Motor Engram: Motor Map Plasticity as a Mechanism for Encoding Motor Experience. The Neuroscientist 2005

Lerman MD. The muscle engram: the reflex that limits conventional occlusal treatment. Cranio. 2011

Anterior Stop Orthotic 3 Effects

1. Allows Maxilla, Mandible, and Temporal bones to align.
2. Major decrease in muscle contraction force, most patients.
3. Breaks muscle engram avoidance and bracing patterns.



	µV	µV
TA-R	100.6	15.7
TA-L	108.9	25.3
MM-R	115.4	25.5
MM-L	70.5	6.8

Major decrease in muscle power with D-PAS

Anterior Stop Orthotics Utilization

- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

Palatal Anterior Stop

APS In Office Anterior Stop

APS Home Trial
Temporary Anterior Stop

***Do not send patient home with small anterior stops that can be aspirated.

Anterior Stop Orthotics

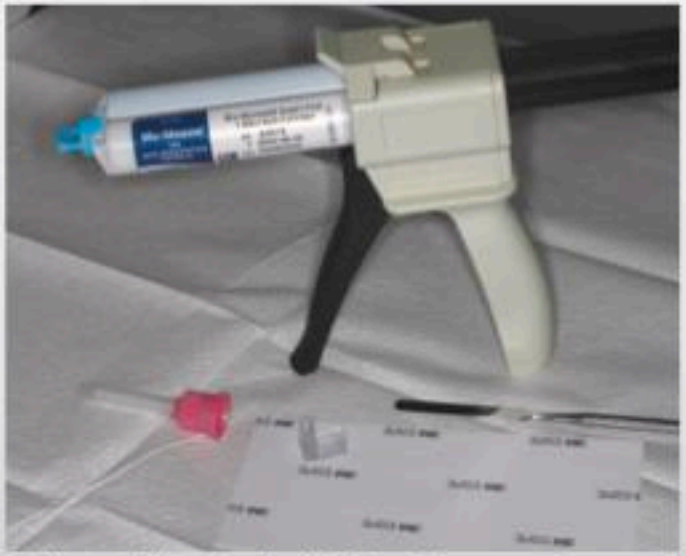
- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

APS In Office
Anterior Stop
2.5 mm

Pankey In Office
Anterior Stop

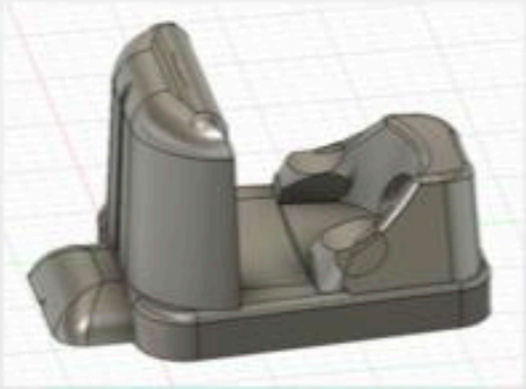
***Do not send patient home with small anterior stops that can be aspirated.

Anterior Stop Orthotic
In Office Diagnostic Test



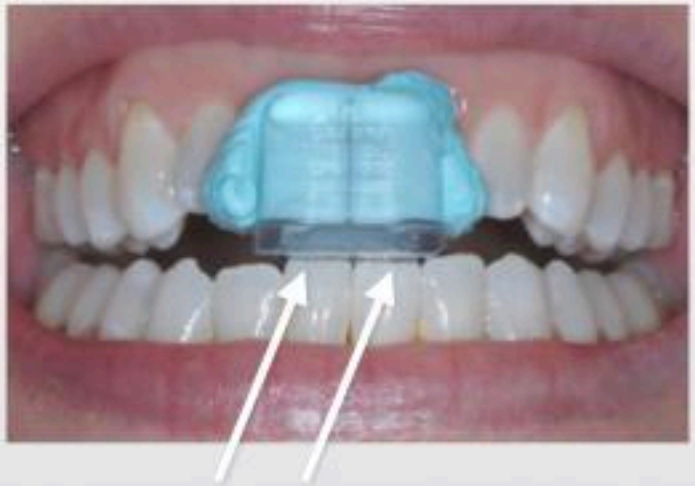
Reline with Parkell Blu-Mousse Super Fast

Can do 2nd reline over
top of the first if needed



APS Anterior Stop 2.5mm

Easy to hold and align
Built in undercuts
Long enough for class 2 and class 3
Is bondable to composite

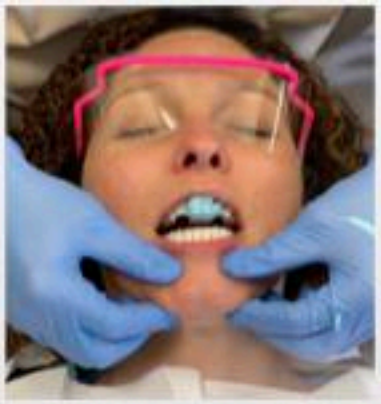


2 points of contact

Pitch Perpendicular
to Arc of Closure

Anterior Stop Orthotic In Office Diagnostic Test

ArrowPath Sleep
Anterior Stop



Deprogram Muscle Engrams

If pain reduces, Occlusion/ Cranial Alignment and/or Muscle Engrams are part of the problem

<u>With anterior stop in place:</u>

5-10x wide open solid tap, open tap far left, open tap far right

2nd round same except Dr unexpectedly accelerates closing a few times

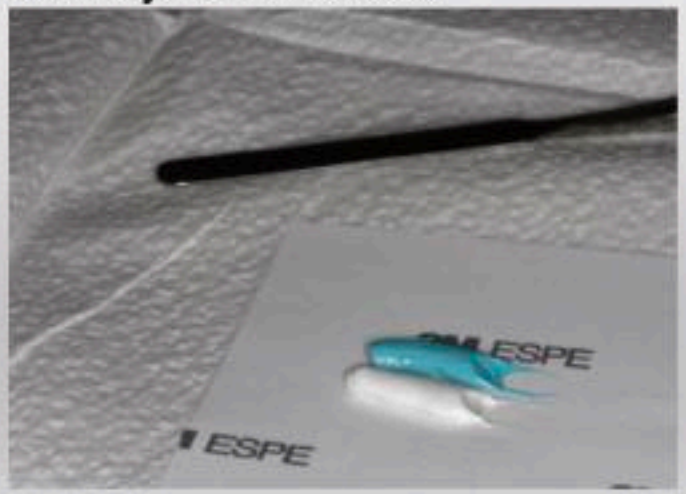
Occipital Lift with 3 deep breaths. Posterior neck opening muscle massage.

3rd round same as first except less taps each position

Office USE ONLY Do not send home with patient

Anterior Stop Orthotic
In Office Diagnostic Test

Can do 2nd mix to
overlay 1st if needed



Anterior Stop Orthotic
In Office Diagnostic Test

Does the occlusion, cranial alignment, and/ or muscle bracing have anything to do with the dysfunction or pain?

Are the TMJ muscles inhibited from full contraction with anterior only tooth contact?

ArrowPath Sleep
Anterior stop 2.5 mm

>30% of headaches have an occlusal component

Occlusal adjustment in patients with craniomandibular disorders including headaches. A 3- and 6-month follow-up. Vallon D, Ekberg E, Nilner M. Acta Odontol Scand. 1995

Response to occlusal treatment in headache patients previously treated by mock occlusal adjustment. Forssell H, Kirveskari P, Kangasniemi P. Acta Odontol Scand. 1987

Case MY

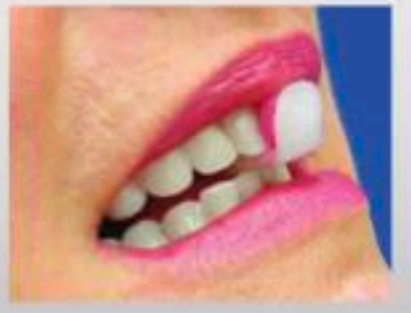
Anterior Stop Orthotics

Diagnostic Test

Patient Awareness

Disease Management

Bite Recording Tool



Lucia Jig
Great Lakes Orthodontics

CR Bite Registration

Brown Stick Compound
Futar D- Kettenbach

Leaf Gauge Great Lakes Orthodontics

I now use Aluwax and bimanual manipulation.

9 bite records 3 different ways

Denar
VeriCheck

Anterior Stop Orthotics

- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

APS Airway Bite Anterior Stop 4mm

George Gauge

Airway Metrics

ArrowPath Sleep Airway Bite

Try in anterior stop before reline.
Verify where patient occludes in full range of excursions

APS Airway Bite Anterior Stop 4mm

Reline with Parkell Blu-Mousse Super Fast
Can do 2nd reline over top of the first if needed

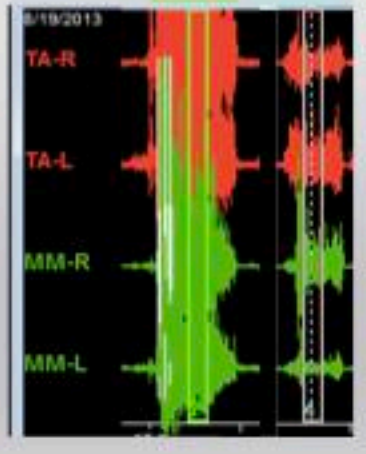
Device shifted back so flush with buccal surface of front teeth

Device shifted forward so lingual surface of front teeth touch device.

Use anterior stop and an EMG to choose style of sleep device:

Patient with muscles
<u>inhibited by anterior only contact</u>

	Clench MaxIC	Anterior Stop D-PAS
	µV	µV
TA-R	100.6	15.7
TA-L	108.9	25.3
MM-R	115.4	25.5
MM-L	70.5	6.8

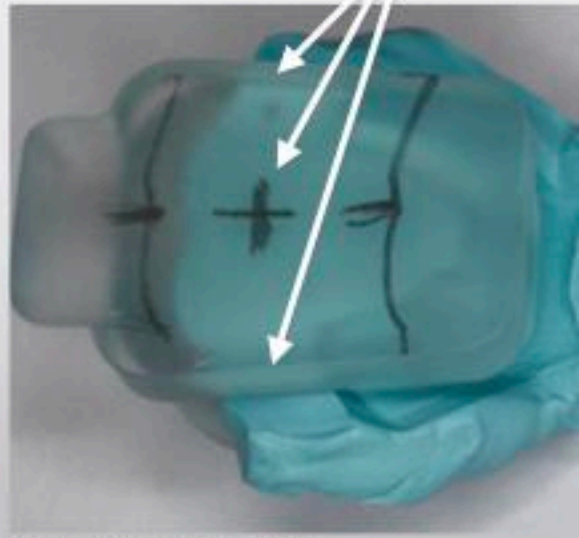


Will sleep airway device have an anterior stop or posterior contact?

ArrowPath Sleep Airway Bite

Mark furthest forward and back jaw position and midline with sterile disposable pencil

Place bonding agent



Measure and mark the amount of protrusive you want to build into the Mandibular Advancement Device

50% is typically a good place to start

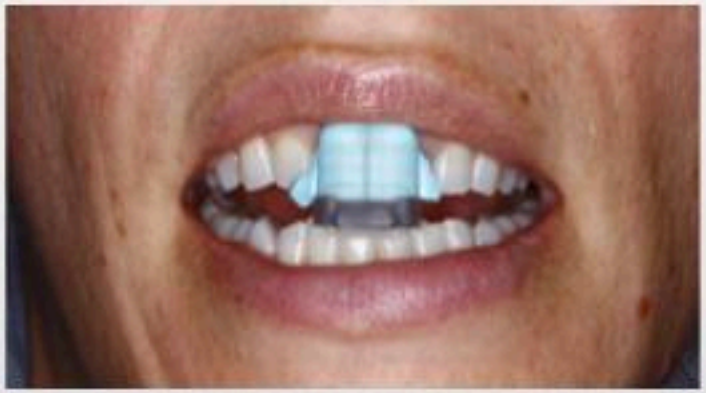
ArrowPath Sleep Airway Bite

Move jaw into position, verify with tap tap, then flow flowable composite in front of lower incisors, cure.

At edge of anterior stop flow some composite behind teeth and cure.

Jaw is now held stable in forward position.

ArrowPath Sleep Airway Bite



Jaw is held stable in forward position.

Silicone bite registration of airway bite

or take digital scan with anterior stop in place and jaw positioned forward

Anterior Stop Orthotics

- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

The D-PAS
Diagnostic Palatal Anterior Stop

Kois Deprogrammer

or Upper Hawley
with Anterior stop

Anterior Stop Orthotics

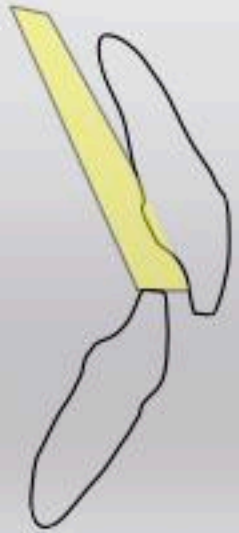
Diagnostic Test
Patient Awareness
Disease Management
Bite Recording Tool

The D-PAS
Diagnostic Palatal Anterior Stop

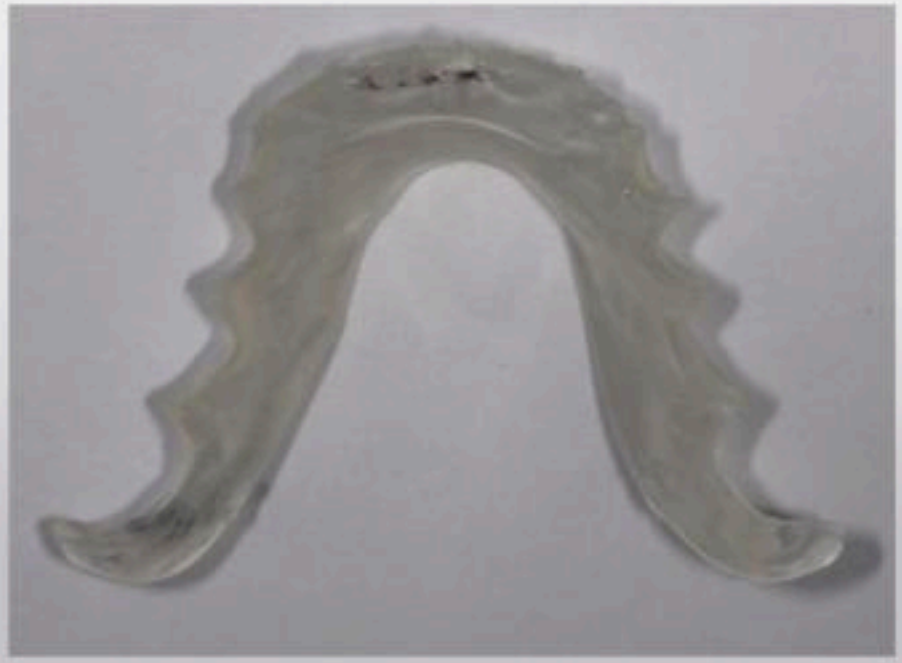
Basically a relined upper Hawley retainer with anterior stop, no wire, no buccal restrictions.

Anterior Stop Orthotics

Basically a relined upper Hawley retainer with anterior stop, no wire, no buccal restrictions.



The D-PAS
Diagnostic Palatal Anterior Stop



Diagnostic Palatal Anterior Stop

D-PAS Test: Wear 3 nights, then 2 days

Better- Decrease Symptoms

Sleep Clenching: Wear D-PAS as night guard

Occlusal Muscle Disharmony: Occlusal Adjust

Worse- Increase Symptoms

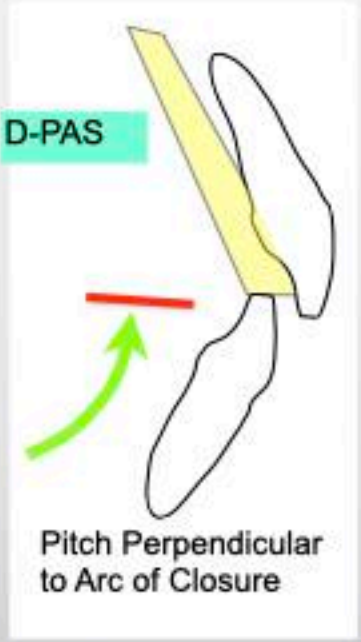
Mechanically Unstable TMJ, joint subluxation

Intracapsular Problem TMJ

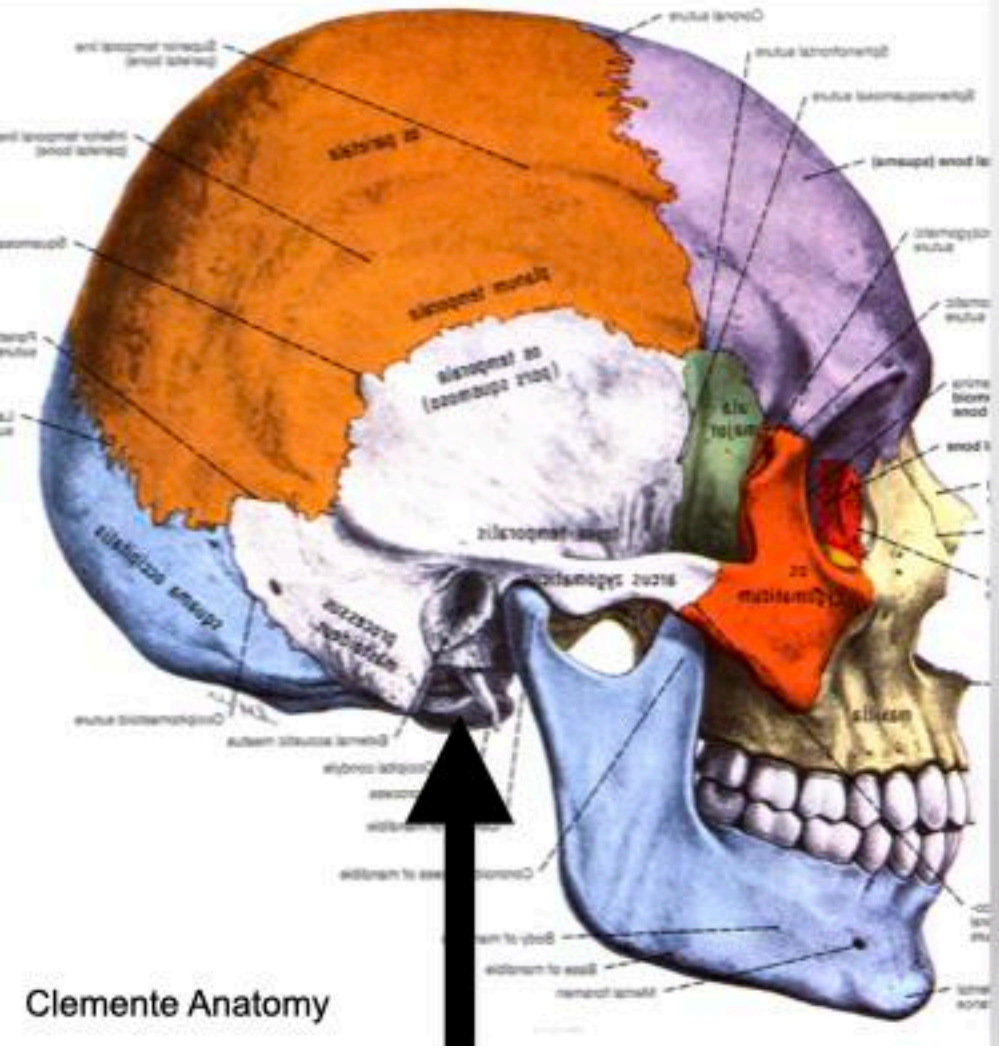
Stays the Same- No Change in Symptoms

Damaged TMJ are mechanically stable

Pain not related to occlusion

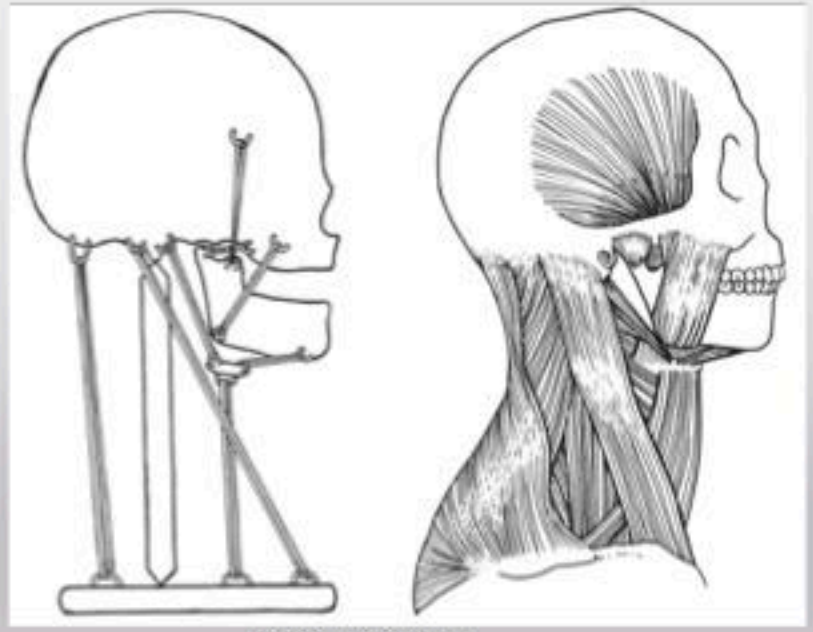


Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache…..BMC Oral Health. 2008 Jul PMID: 18662411

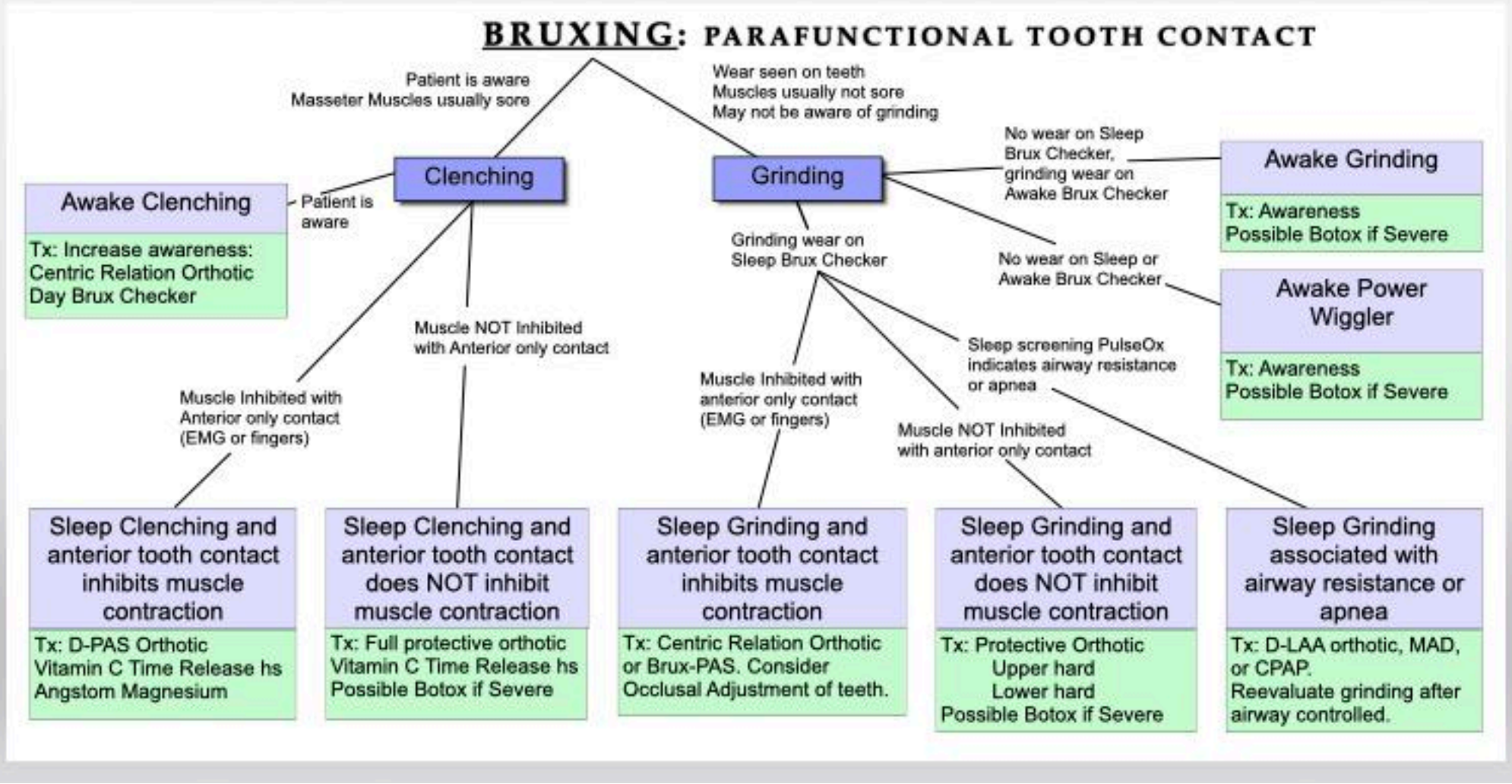


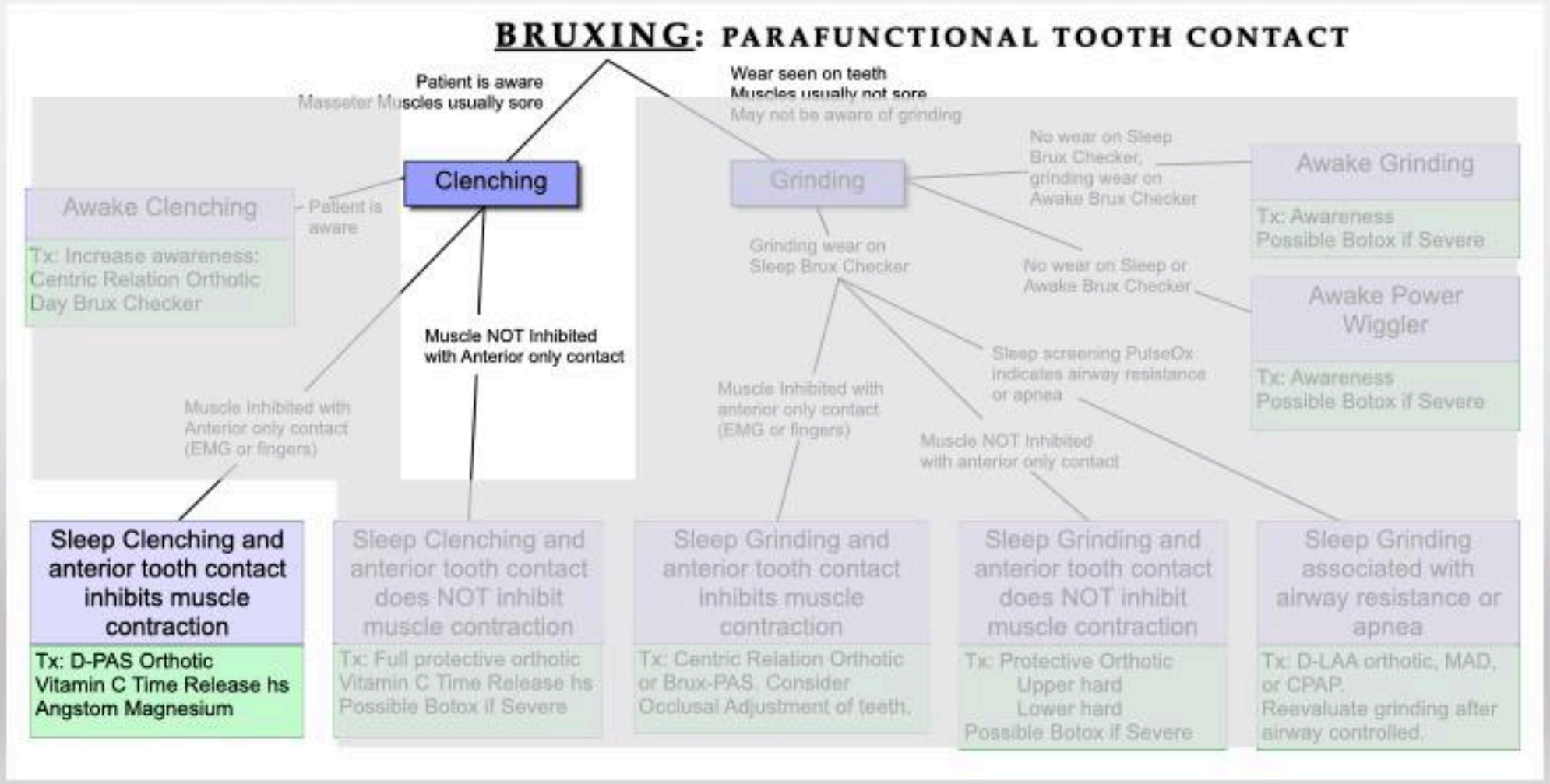
Clemente Anatomy

There is no way the skull is one solid piece that dies not flex.



Jeffery Okeson
Temporomandibular Disorders and Occlusion


BRUXING: PARAFUNCTIONAL TOOTH CONTACT
Patient is aware
Masseter Muscles usually sore
Wear seen on teeth
Muscles usually not sore
May not be aware of grinding
Clenching
Grinding
Awake Clenching
Patient is aware
Tx: Increase awareness:
Centric Relation Orthotic
Day Brux Checker
No wear on Sleep Brux Checker, grinding wear on Awake Brux Checker
Awake Grinding
Tx: Awareness
Possible Botox if Severe
Grinding wear on Sleep Brux Checker
No wear on Sleep or Awake Brux Checker
Awake Power Wiggler
Tx: Awareness
Possible Botox if Severe
Muscle Inhibited with Anterior only contact (EMG or fingers)
Muscle NOT Inhibited with Anterior only contact
Muscle Inhibited with anterior only contact (EMG or fingers)
Sleep screening PulseOx indicates airway resistance or apnea
Muscle NOT Inhibited with anterior only contact
Sleep Clenching and anterior tooth contact inhibits muscle contraction
Tx: D-PAS Orthotic
Vitamin C Time Release hs
Angstom Magnesium
Sleep Clenching and anterior tooth contact does NOT inhibit muscle contraction
Tx: Full protective orthotic
Vitamin C Time Release hs
Possible Botox if Severe
Sleep Grinding and anterior tooth contact inhibits muscle contraction
Tx: Centric Relation Orthotic or Brux-PAS. Consider Occlusal Adjustment of teeth.
Sleep Grinding and anterior tooth contact does NOT inhibit muscle contraction
Tx: Protective Orthotic
Upper hard
Lower hard
Possible Botox if Severe
Sleep Grinding associated with airway resistance or apnea
Tx: D-LAA orthotic, MAD, or CPAP.
Reevaluate grinding after airway controlled.


BRUXING: PARAFUNCTIONAL TOOTH CONTACT
Patient is aware
Masseter Muscles usually sore
Wear seen on teeth
Muscles usually not sore
May not be aware of grinding
Clenching
Grinding
Awake Clenching
Tx: Increase awareness:
Centric Relation Orthotic
Day Brux Checker
Patient is aware
No wear on Sleep Brux Checker, grinding wear on Awake Brux Checker
Awake Grinding
Tx: Awareness
Possible Botox if Severe
Grinding wear on Sleep Brux Checker
No wear on Sleep or Awake Brux Checker
Awake Power Wiggler
Tx: Awareness
Possible Botox if Severe
Muscle NOT Inhibited with Anterior only contact
Muscle Inhibited with Anterior only contact (EMG or fingers)
Muscle Inhibited with anterior only contact (EMG or fingers)
Sleep screening PulseOx indicates airway resistance or apnea
Muscle NOT Inhibited with anterior only contact
Sleep Clenching and anterior tooth contact inhibits muscle contraction
Tx: D-PAS Orthotic
Vitamin C Time Release hs
Angstom Magnesium
Sleep Clenching and anterior tooth contact does NOT inhibit muscle contraction
Tx: Full protective orthotic
Vitamin C Time Release hs
Possible Botox if Severe
Sleep Grinding and anterior tooth contact inhibits muscle contraction
Tx: Centric Relation Orthotic or Brux-PAS. Consider Occlusal Adjustment of teeth.
Sleep Grinding and anterior tooth contact does NOT inhibit muscle contraction
Tx: Protective Orthotic
Upper hard
Lower hard
Possible Botox if Severe
Sleep Grinding associated with airway resistance or apnea
Tx: D-LAA orthotic, MAD, or CPAP.
Reevaluate grinding after airway controlled.

Anterior Stop Orthotics

Sleep Clenching with anterior tooth contact muscle inhibition

The D-PAS
Diagnostic Palatal Anterior Stop

Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache…..BMC Oral Health. 2008 Jul PMID: 18662411

Baad-Hansen L, Jadidi F, Castrillon E, Thomsen PB, Svensson P: Effect of a nociceptive trigeminal inhibitory splint on electromyo- graphic activity in jaw closing muscles during sleep. J Oral Rehabil 2007

Clenching verses Grinding and the TMJ

Clenching- Squeeze your teeth
Destroys Cartilage

Grinding- Rub your teeth
Destroys teeth
Adaptation in Joint

D-PAS

Manage Clenching with D-PAS

Manage grinding with Brux-PAS

Must have muscle inhibition!!!

Brux-PAS +
Essix

Brux-PAS

Note: Soft orthotics increase power of clench or grind

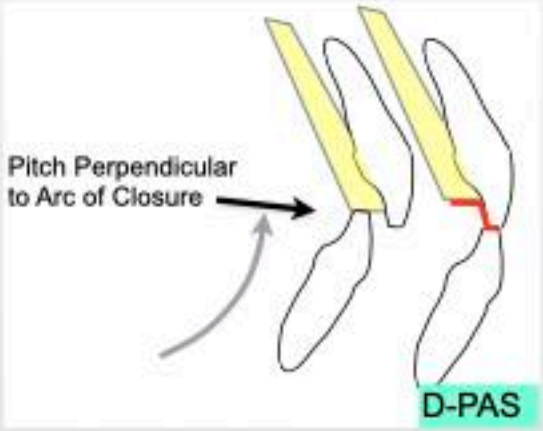
D-PAS
Key Features

Pitch is perpendicular to arc of closure
Flat landing area

Reline
So forces go into whole maxilla

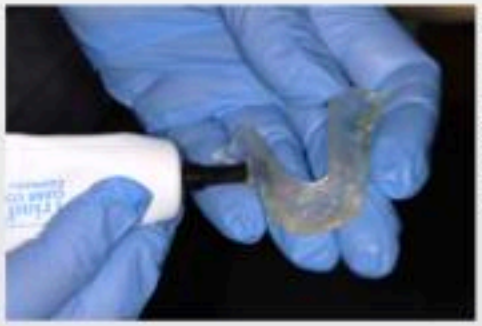
Minimal change in vertical
This is a clenching test, not a grinding test

Nothing wraps around the buccal
Allows for maxillary flex



When reline can do just anterior if good retention.
Must reline at lease cuspid to cuspid.

Reline D-PAS



Dentsply/Sirona Eclipse and Triad materials no longer made

Keysplint Soft 3D Printed

Reline Pentron TempSpan Temporary Material dual cure

Seat in mouth

Wipe away Excess

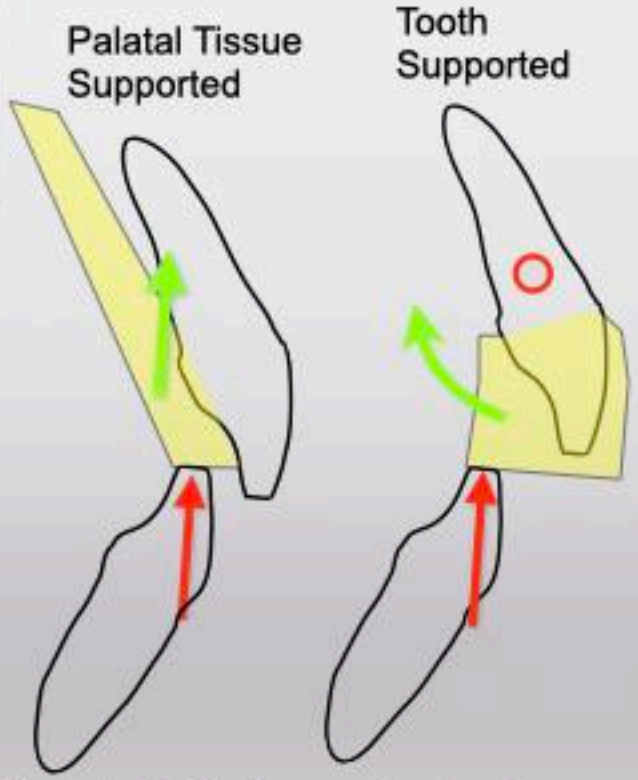
Careful Cure 0.25 seconds

Reline will get very hot if cured too fast. Keep the light moving so no one area has light for more than 0.25 seconds at a time. All surfaces are exposed including the palate and distal to the molars.

Anterior Stop Force Distribution: D-PAS vs NTI

D-PAS
Diagnostic Palatal
Anterior Stop

Must be relined



NTI-tss Splint
Nociceptive Trigeminal Inhibition
Tension Suppression System

NTI is tooth supported, hard reline.
Contact causes tooth flexure and rotation
Cranial/Skull unfriendly
Can end up being inhaled or swallowed

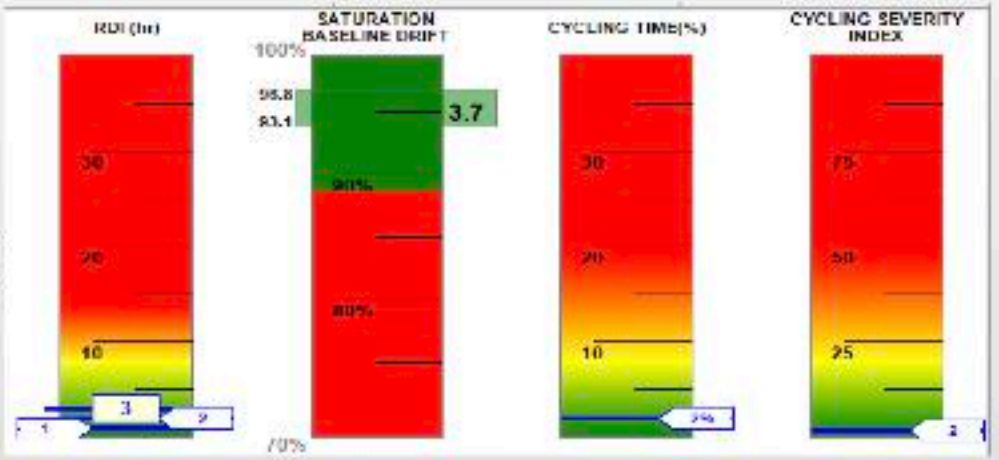
Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache…..BMC Oral Health. 2008 Jul PMID: 18662411

Does the dental orthotic make the airway better or worse?

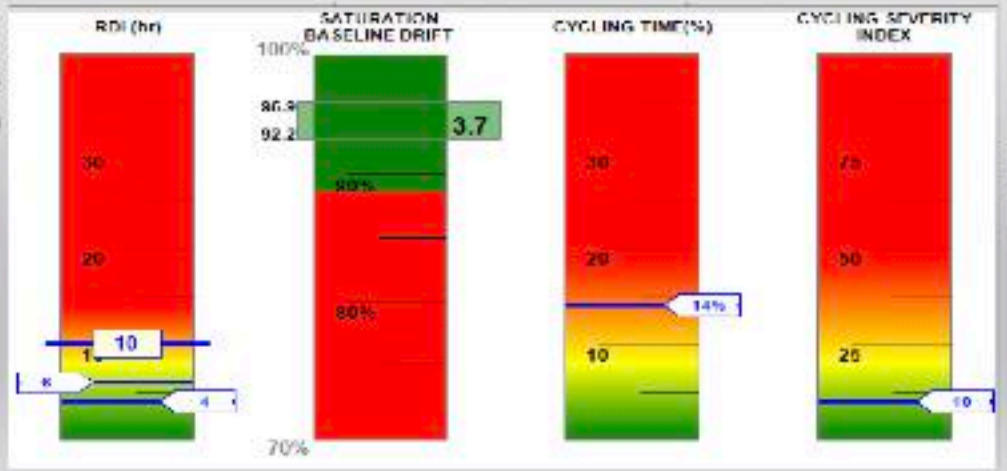
RDI= Respiratory Distress Index

Sometimes D-PAS makes airway better, sometimes worse

No dental orthotic
RDI = 3



Dental Orthotic:
Anterior Stop: D-PAS
RDI =10



High Resolution Pulse Oximetry

PULSOX 300i, Konica Minolta with data analysis Patient Safety, Inc.

Is there an airway issue?
(Upper Airway Resistance or Obstructive Sleep Apnea)

"Sleep Airway Screening"

High Resolution
Pulse Oximetry

Data every 1
second average
over 3 seconds

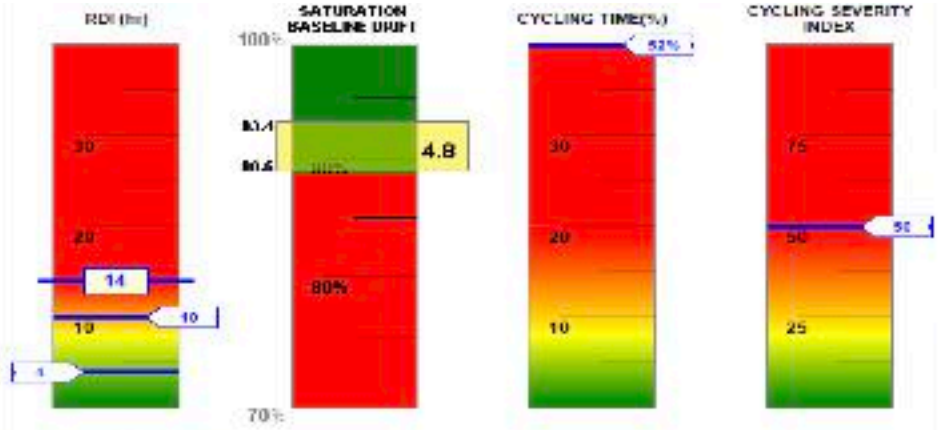
Patient Safety Inc.

SLEEPSAT

SATSCREEN

Order Pulse Ox and Software: Go to my website or
www.patientsafetyinc.com

Sleep SAT is the replacement for
PULSOX 300i, Konica Minolta no longer made



PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 3 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

Anterior Stop Orthotics

Diagnostic Test

Patient Awareness

Disease Management

Bite Recording Tool

*** Verify muscle inhibition with anterior only contact before sending home

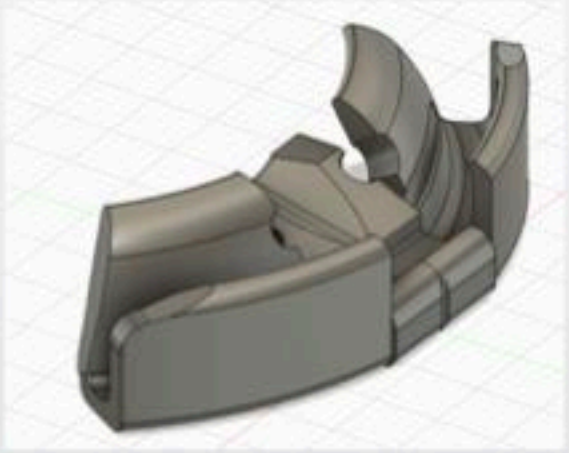
APS Home Trial Anterior Stop

Modified Quick Splint

Anterior Stop Orthotics

- Diagnostic Test
- Patient Awareness
- Disease Management
- Bite Recording Tool

APS
Home Trial Anterior Stop



Use for 3 days post
Arthrocentesis

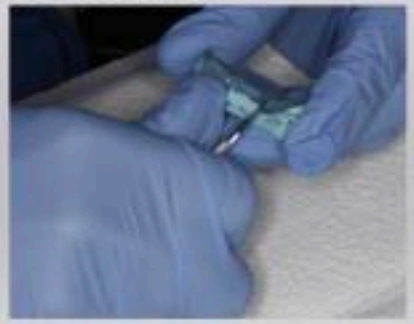
APS
ArrowPath Sleep

APS Home Trial Anterior Stop

Hard material that gets very soft when heated

Place in hot water then mold in mouth

Reline with blue mousse
Trim excess



APS
ArrowPath Sleep

APS Home Trial Anterior Stop

Step 1: Mold arch with occluding surface parallel to occlusal plane

Hot Water 75-80° C

greenpaperproducts.com

Align occlusal surface

Mold arch, facial and lingual

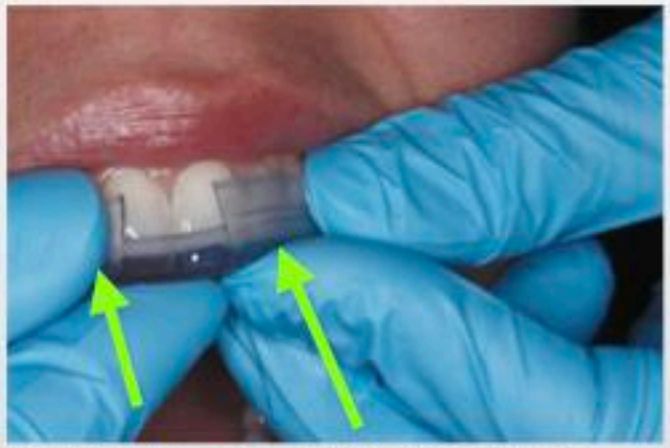
APS
ArrowPath Sleep

APS Home Trial Anterior Stop

Step 2 optional if you want only central incisors to touch:

Reheat one wing, Shape wing so it sits apical to occluding surface of the center of device. Maintain contact of facial and lingual with finger pressure until cool.

Reheat one wing



Support non heated side

Firm pressure with index finger

Mold facial, lingual and incisal as it cools

Indented

Repeat for other side

APS
ArrowPath Sleep

APS Home Trial Anterior Stop

Step 3: Reline

Verify good muscle inhibition with clench before sending home

Reline with blue mousse

Trim excess

Adjust so only contact is lower central incisors

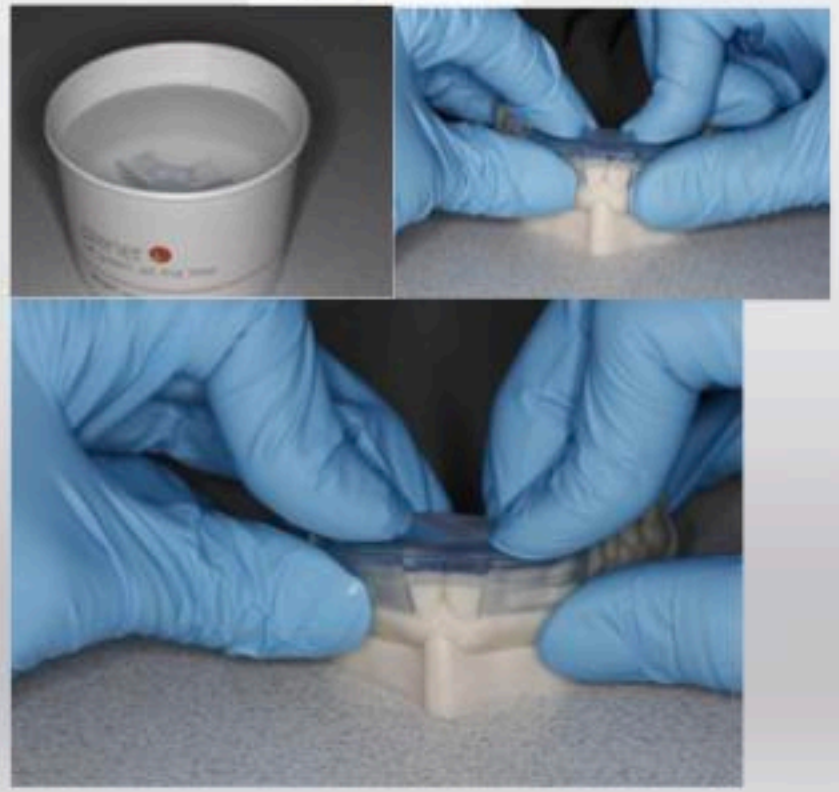
Note: You can bond to device with most light cure products

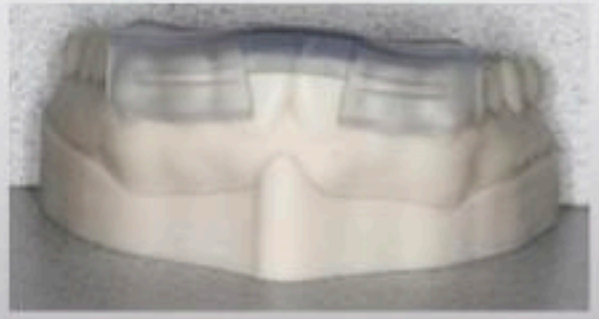
APS
ArrowPath Sleep

APS Home Trial Anterior Stop

Can practice on models.

When finished just throw back in hot water and device will assume original shape





APS
ArrowPath Sleep

Anterior Stop Orthotics

Diagnostic Test

Patient Awareness

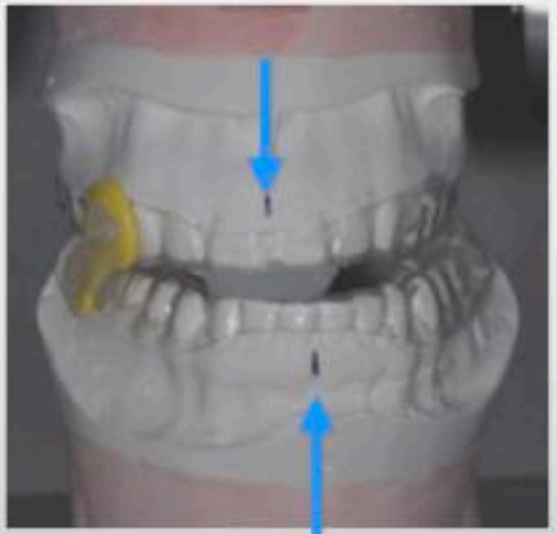
Disease Management

Bite Recording Tool

Night guard for
Parafunctional Lateral Grinding
Sympathetic Arousals

APS Lat- Brux

APS Lat-Brux Lateral Bruxing Orthotic

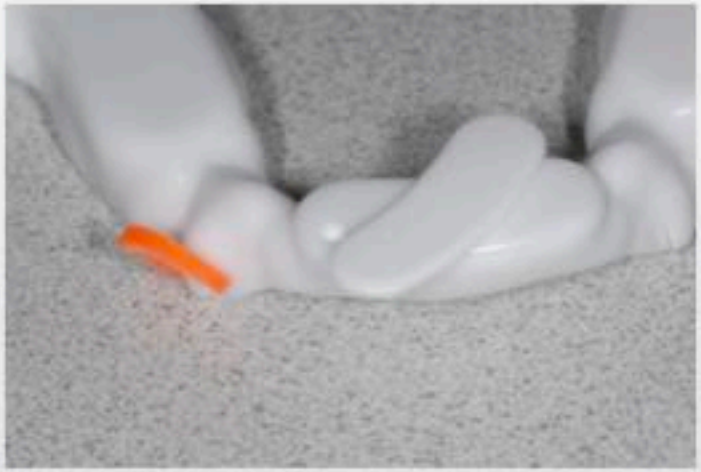


Elastomer Pulls Right condyle forward out of fossa.
Moves the jaw to the **Left.**

Next night switch elastic to other side, alternate.

Anterior Occlusal Stop opens the bite and provides vertical support.

Printed Nylon
Can not be relined or added to
Not holding up well over time



Newer version coming soon not out of nylon……

APS

ArrowPath Sleep

www.APSleep.com
info@apsleep.com

APS In Office Anterior Stop 2.5mm

APS Airway Bite 4mm

APS Home Trial Anterior Stop

APS D-PAS

APS Lat-Brux

John R. Droter, DDS
www.drdroter.com
john@apsleep.com

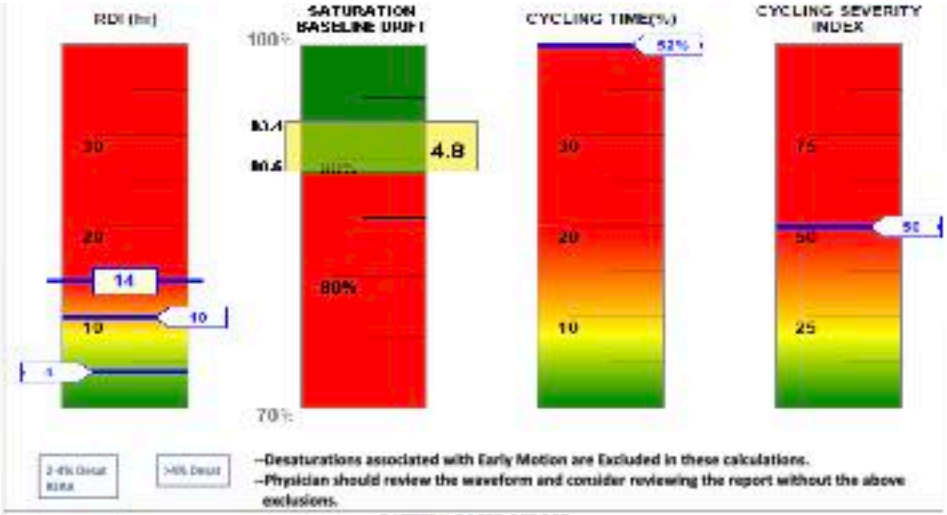
APS
ArrowPath Sleep

www.apsleep.com
info@apsleep.com

Facial Pain Diagnosis

Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. Anterior Stop Test
5. **Sleep Airway Screening**
6. CT Scan
   MRI
   Blood Tests



--Desaturations associated with Early Motion are Excluded in these calculations.
--Physician should review the waveform and consider reviewing the report without the above exclusions.

PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 2 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

Obstructive Sleep Apnea

Normal Airway

Upper Airway Resistance
Snoring in men, purring in women

Obstructed Apnea

Images from Somnodent. https://somnomed.com/us

Is there an airway issue?
(Upper Airway Resistance or Obstructive Sleep Apnea)

"Sleep Airway Screening"

High Resolution
Pulse Oximetry

Data every 1
second average
over 3 seconds

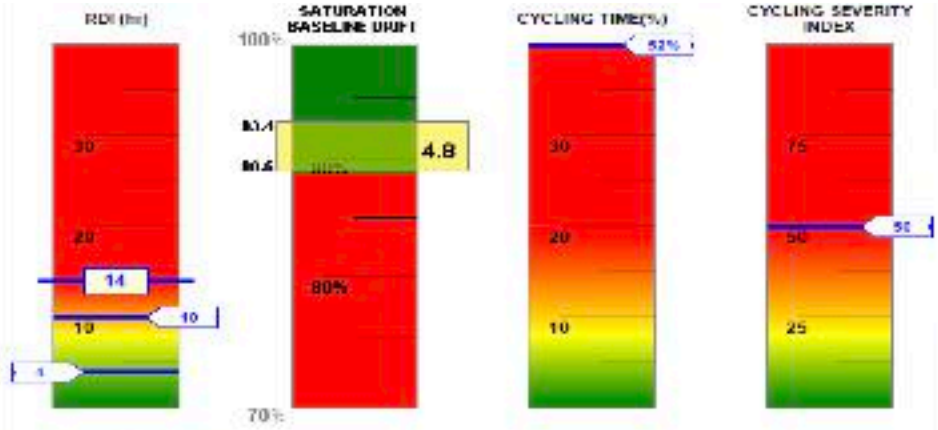
Patient Safety Inc.

SLEEPSAT

SATSCREEN

Order Pulse Ox and Software: Go to my website or
www.patientsafetyinc.com

Sleep SAT is the replacement for
PULSOX 300i, Konica Minolta no longer made



PATTERN BASED REPORT

OXYGEN SATURATION BASELINE ANALYSIS

Oxygen Saturation Baseline Drift(OSBD) (normal <= 3)	5
Initial Saturation Baseline	93
Lowest Saturation Baseline	89
Highest Saturation Baseline	93

Baseline is determined by the Mean SpO2 during 3 Minute window without Artifact and without Events.

SPO2 CYCLING

% Time in Cycling (Duration)	52%	(02:50:14)
Cycling Frequency	45	
96% - Lowest Sat	12	
Cycling Severity Index	50	

The total time oxygen saturation was <= 88% was 00:13:39

TRADITIONAL REPORT

ODI4:	11
Total ODI4 Events:	58
Time in ODI4 Events:	00:29:26
Avg ODI4 Event Duration:	00:00:28
<=88% ODI4 Events:	23
<=88% Longest Duration:	00:01:21
Minimum SpO2:	84
Avg Low 10% SpO2:	86
Avg Low SpO2:	89
Avg Low SpO2 <=88%:	87

Definition of ODI4 Event: a fall in oxygen saturation of at least 4% and persisting greater than 3 seconds.

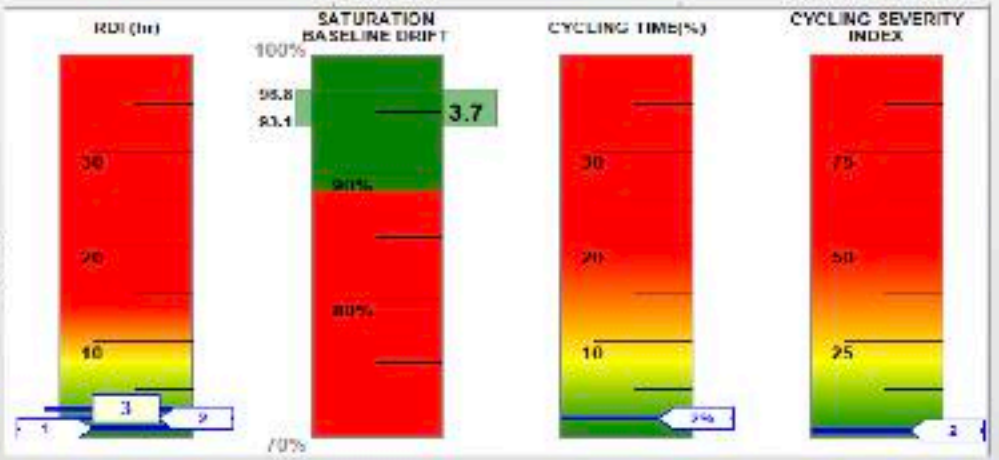
%SpO2	DURATION	%TOTAL
94-100	00:16:37	5%
88-94	04:57:26	91%
80-88	00:13:39	4%
70-80	00:00:00	0%
<= 70	00:00:00	0%
Total	05:27:42	100%
Motion Artifact	00:00:07	0.04%
Error Signal	00:00:05	0.03%

Does the dental orthotic make the airway better or worse?

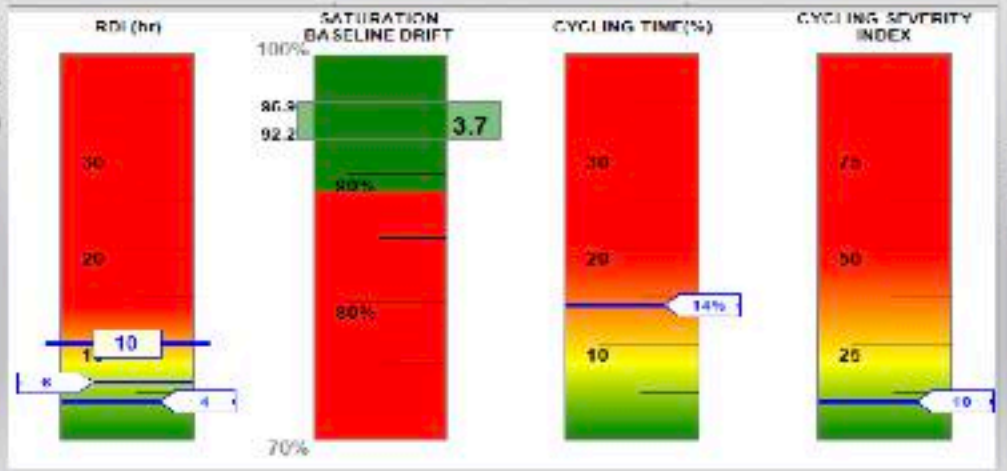
RDI= Respiratory Distress Index

Sometimes D-PAS makes airway better, sometimes worse

No dental orthotic
RDI = 3



Dental Orthotic:
Anterior Stop: D-PAS
RDI =10



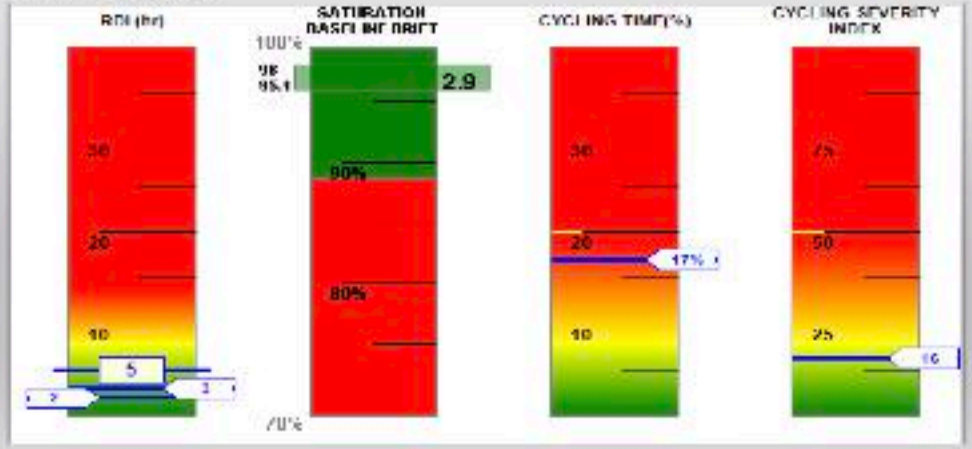
High Resolution Pulse Oximetry

PULSOX 300i, Konica Minolta with data analysis Patient Safety, Inc.

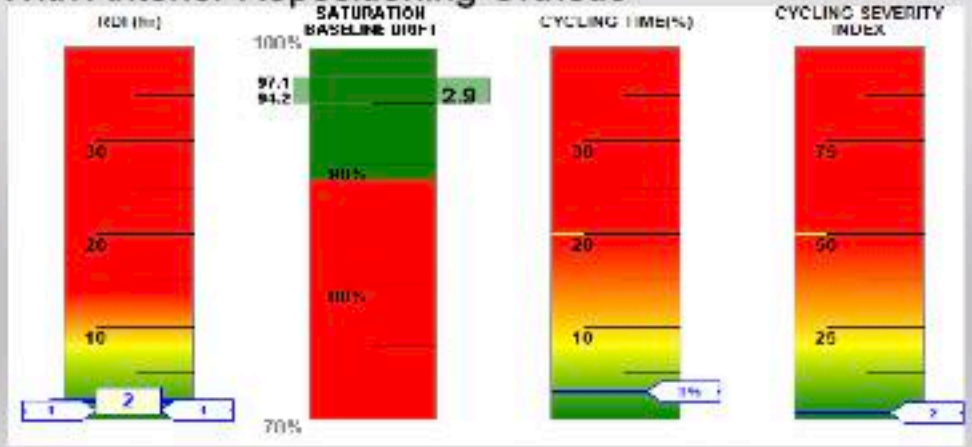
Anterior Repositioning Orthotic

Minolta Pulse Ox

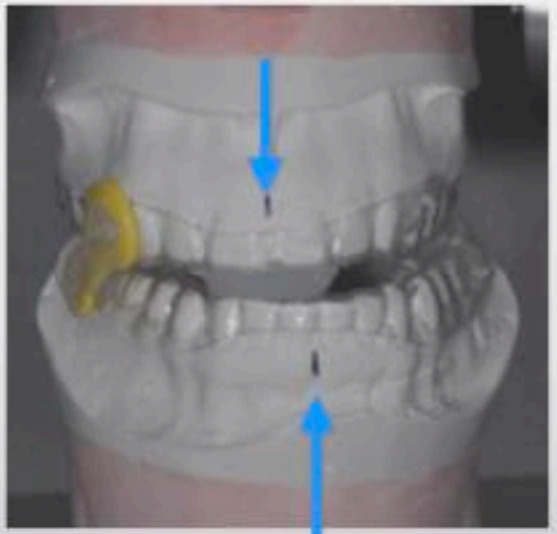
No Orthotic



With Anterior Repositioning Orthotic



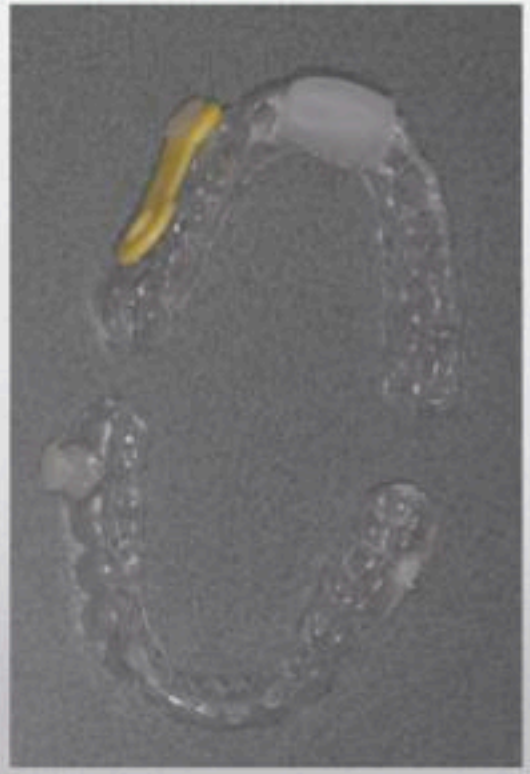
D-LatBrux Lateral Bruxing Orthotic



Elastomer Pulls Right condyle forward out of fossa.
Moves the jaw to the **Left.**

Anterior Occlusal Stop opens the bite and provides vertical support.

D-LatBrux Lateral Bruxing Orthotic



Pull Left

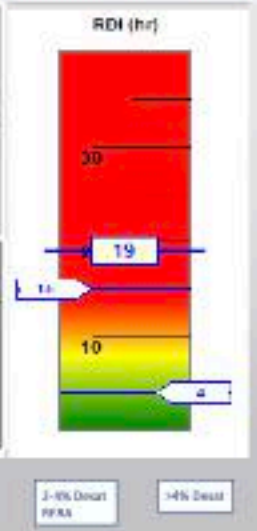
Pull Right

Only one joint is strained at night. Alternating nights wearing Right then Left gives an extra 24 hours of adaptation time to the system, minimizing permanent bite changes.

Note- simulated Left image reverse of Right

Management

Diagnosis	Pattern	Treatment
Obstructive Sleep Apnea	Variable……..	Mandibular Advancement Appliance (after MD approves)



PULSOX 300i, Konica Minolta
with data analysis Patient Safety, Inc.

Pulse Ox Screening

Refer to Medical Sleep Doctor

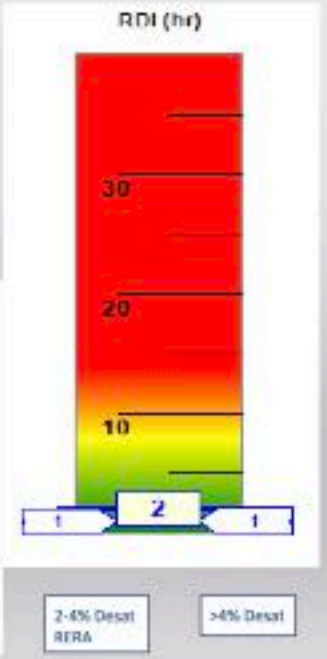
Get approval for Mandibular Advancement Appliance

Verify Airway Improves

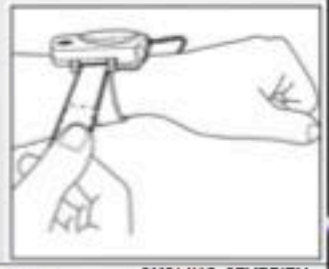
19 events/hr before

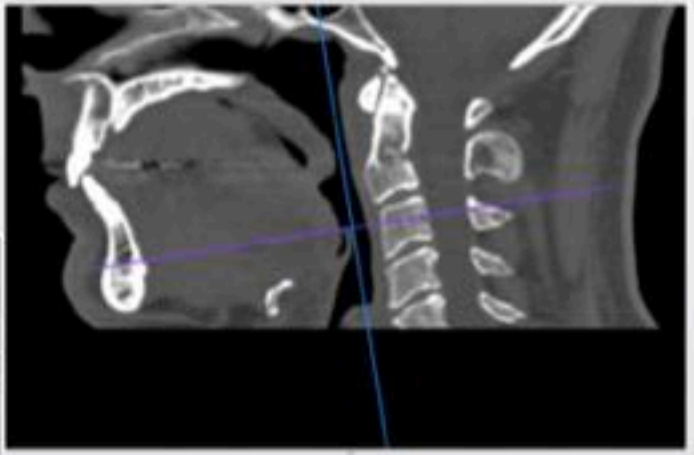
2 events/hr with Orthotic

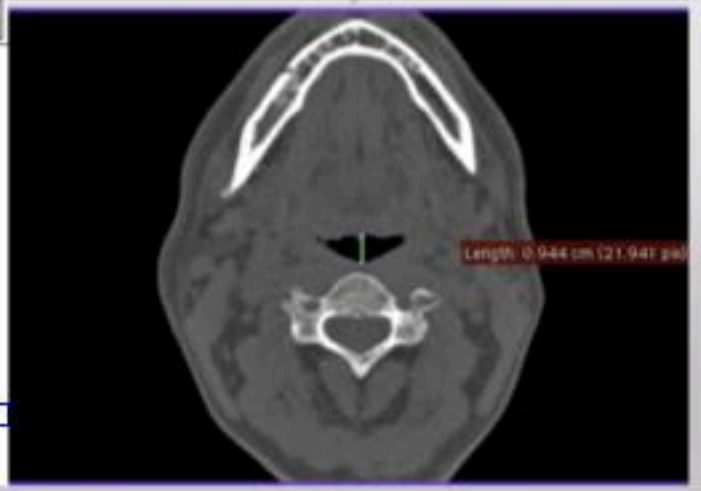
Narval CC
Great Lakes Ortho

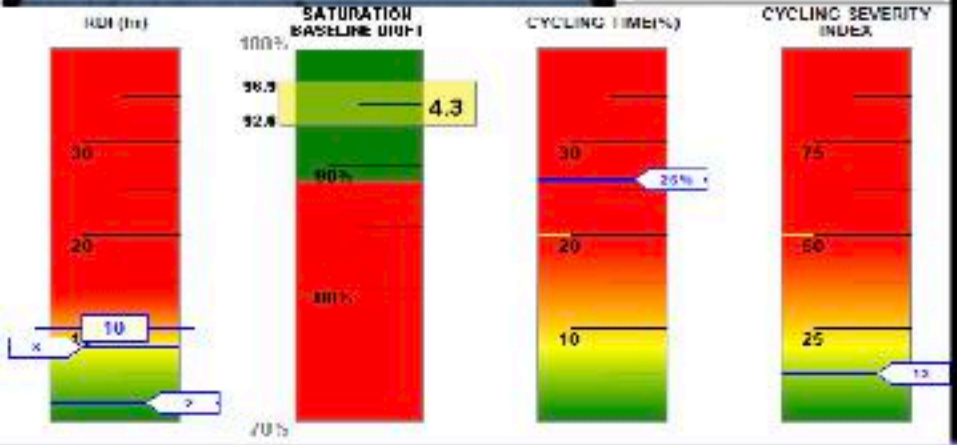


Mild Obstructive Sleep Apnea









Referred to pulmonologist
Medical Sleep Study
PSG- Polysomnogram
RDI 10

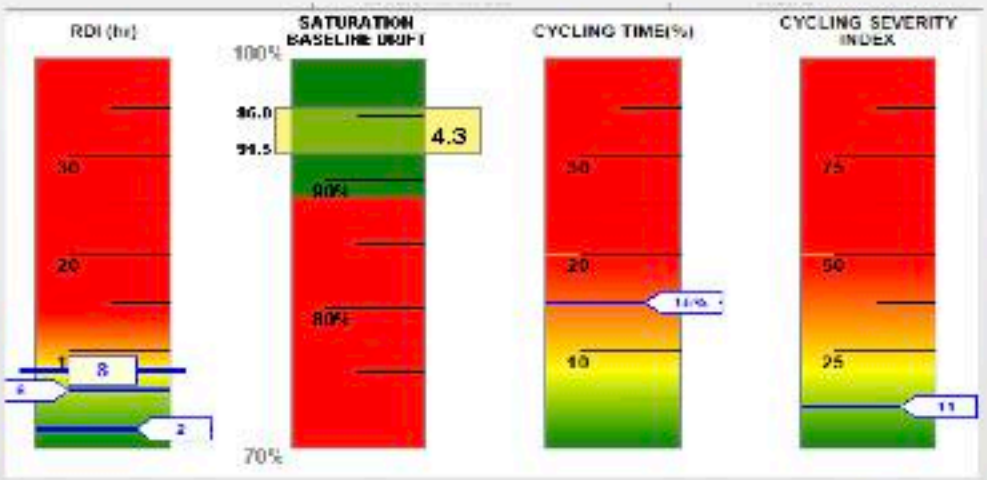
Home Sleep Airway Screening- RDI 10

RDI= Respiratory Distress Index

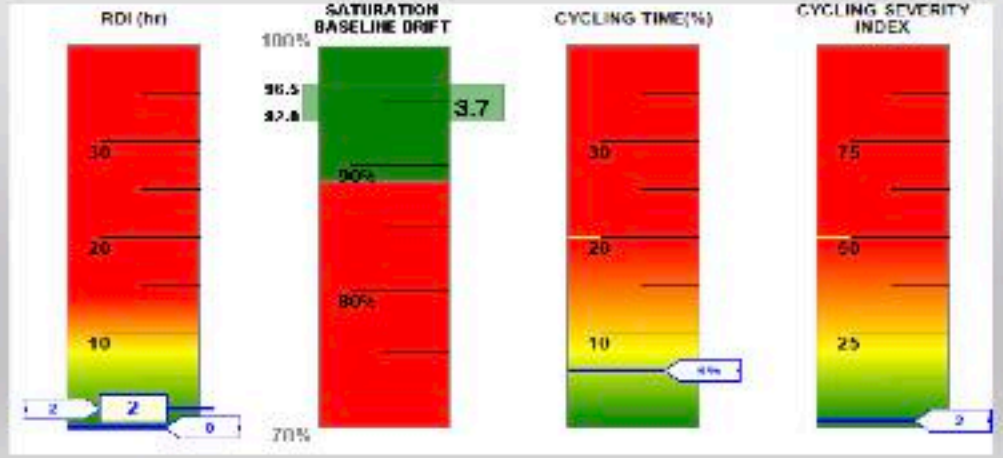
Mild OSA = 5-15 Apnea/hr

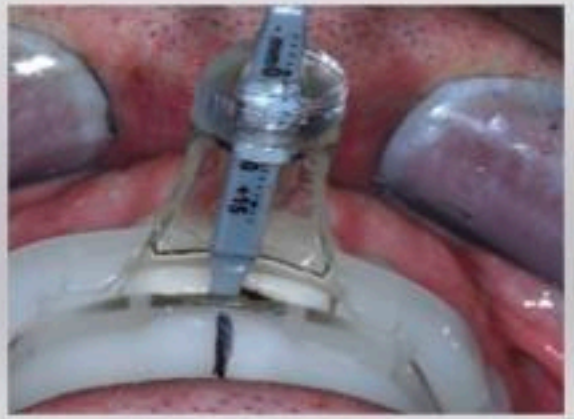
RDI= Respiratory Distress Index

MyTAP Mandible Advanced 4mm RDI 8



MyTAP Mandible Advanced 5mm RDI 2





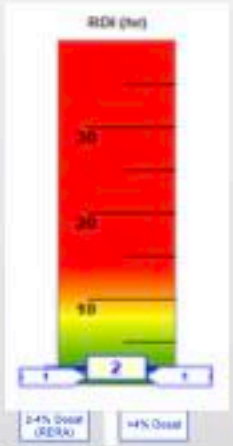
Age 16F
cc: Facial Pain, Excessive Daytime Fatigue

Age 16F
cc: Facial Pain, Excessive Daytime Fatigue

Medical Sleep Study in Lab RDI = 1
Dx: Snoring without evidence of gas exchange abnormalities or sleep disruptions

Sleep Latency Test
Dx: Narcolepsy
Recommend daytime medication

Patient Safety Inc Pulse Ox Sleep Screening
RDI = 2, Autonomic Arousals 31 /h



PULSE RATE DATA

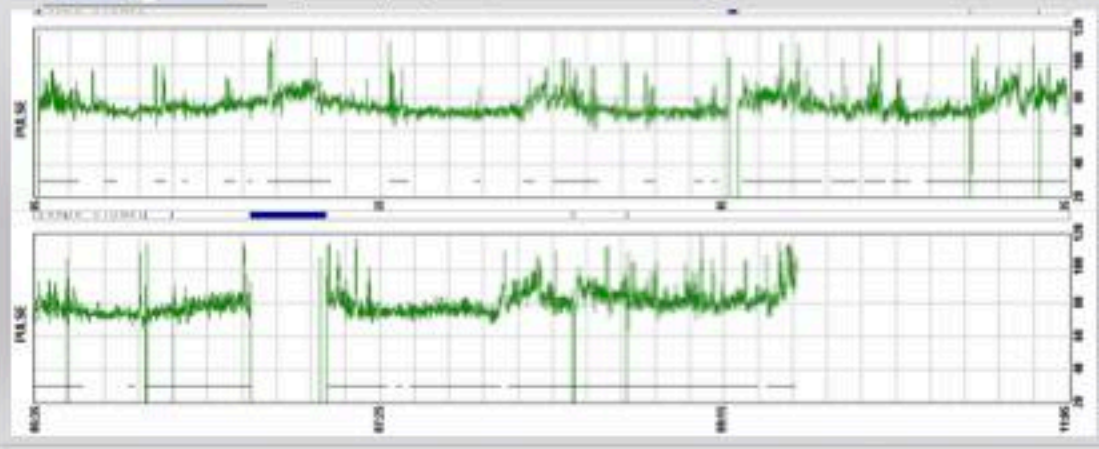
Autonomic Arousals
Index (#/hr): 31

Pulse Rate Range
Mean: 78
Min: 34
Max: 122

Tachycardia - Sleep (>90 bpm)
Duration: 00:34:56
% (VRT): 6%

Bradycardia - Sleep (<50 bpm)
Duration: 00:00:35
% (VRT): 0%

Heart Rate
>90 bpm
for 35 min



Disordered Breathing Disease Progression

Disease Stage 1

Predisposing Factors

Small Airway

Tongue Tie, Lip Tie
Bottle Fed as Infant
Dysfunctional Swallow
Allergies
Nasal Obstruction
Large Tonsil
Large Adenoids
Large Tongue
Mid-face Deficient
Mandibular Deficient
4 Bicuspid Extraction

Disease Stage 2

Compensation:
Airway Maintained

Signs
- Mouth Breathing
- Head Postured Forward
- Jaw Postured Forward
- Tongue Bracing
- Indents in Tongue
- Sore Masseters
- Sore Neck Muscles

Symptoms
- Facial Ache
- Not Waking Rested
- Daily Fatigue
- Neck Soreness

Disease Stage 3

Sleep
Airway Partial Collapse

Signs
- All of stage 1 and 2 plus…..
- Upper Airway Resistance
- 2-4% Drop O_2 Saturation
- RERA- Respiratory Arousals
- Sleep Teeth Grinding
- ⬇ Growth Hormone

Symptoms
- Heart Rate Fluctuation
- Snoring or "Purring"
- Weight Gain
- Cognitive Impairment, ADD
- Hyperactivity

Disease Stage 4

Sleep
Airway Full collapse

Signs
- All of stage 1, 2, 3 plus….
- 4%+ drop O_2 Saturation
- Apnea
- Cardiovascular Damage
- Elevated BP
- GERD

Symptoms
- All of stage 2, 3 plus….
- Worn Teeth

John R. Droter DDS

Disordered Breathing Disease Stage 4

OSA- Obstructive Sleep Apnea

AHI- Apnea Hypopnea Index

Apnea and Hypopnea events per hour

Apnea- Stop airflow for 10 seconds

Hypopnea- <50% airflow or 4+% O_2 Desaturation

AHI 1-4 "Normal" ??	AHI 5-15 Mild OSA	AHI 15-30 Moderate OSA	AHI 30+ Severe

Signs

Apnea

4% drop O_2 Saturation

Cardiovascular Damage

Elevated BP

GERD

Symptoms

Not Waking Rested, Daily Fatigue

Cognitive Impairment

Irreversible Damage

John R. Droter DDS

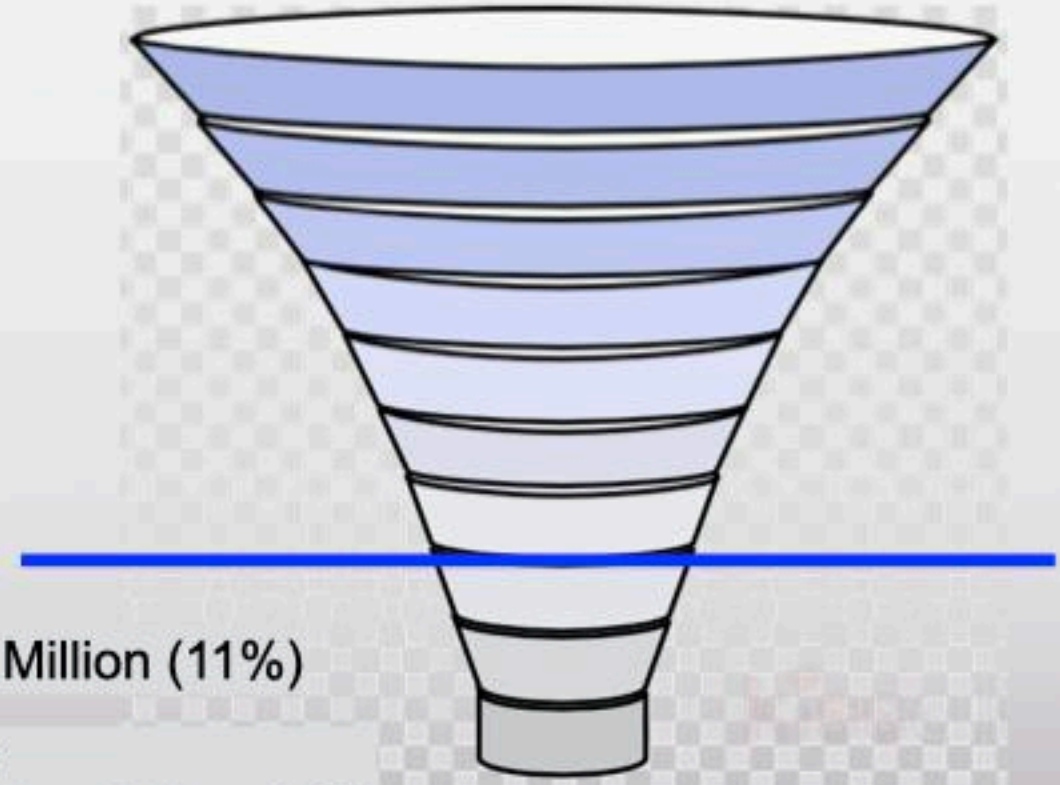
Disordered Breathing USA 2008

Stage 1

Stage 2

Stage 3

Stage 4



Mild OSA- 35 Million (11%)

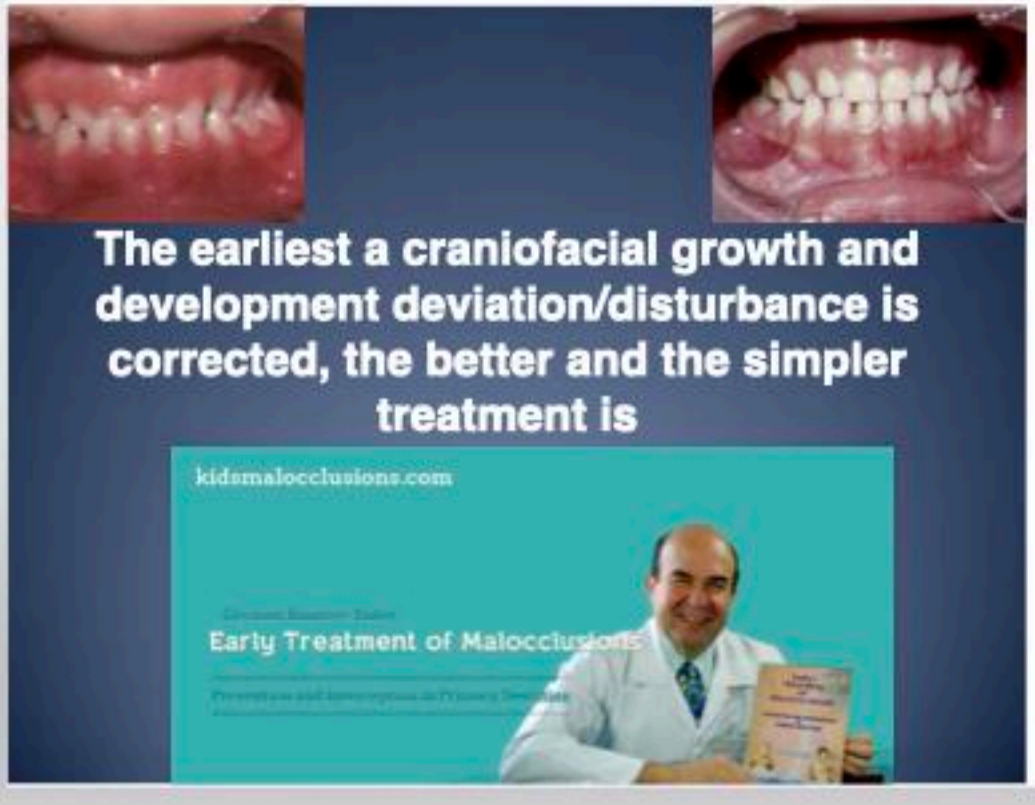
Moderate and
Severe OSA 19.5 Million (6%)

Young, T., Finn, L., Peppard, P. E., Szklo-Coxe, M., Austin, D., Nieto, F. J., et al. (2008). Sleep disordered breathing and mortality: eighteen-year follow-up of the Wisconsin sleep cohort. *Sleep*

US Pop 325 Million

Dr German Ramirez-Yanez

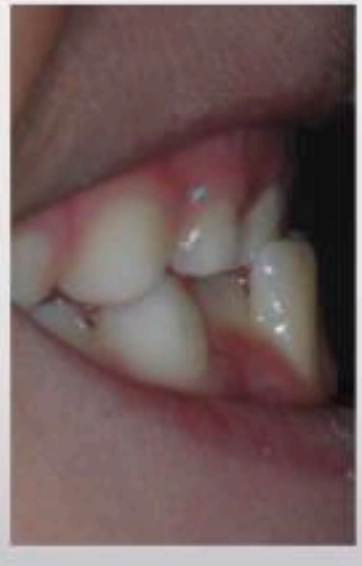
Get his **Free** Textbook on how to do this
kidsmaloccusions.com

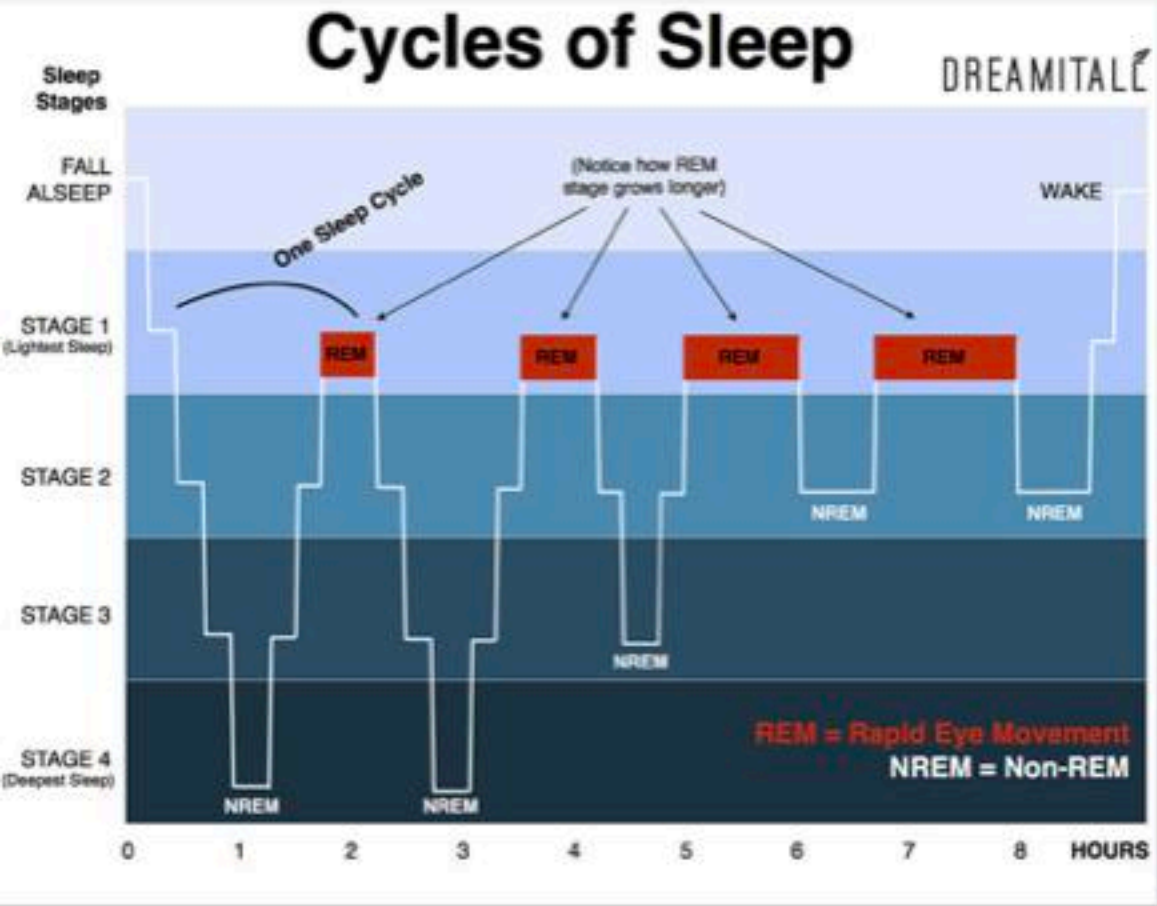


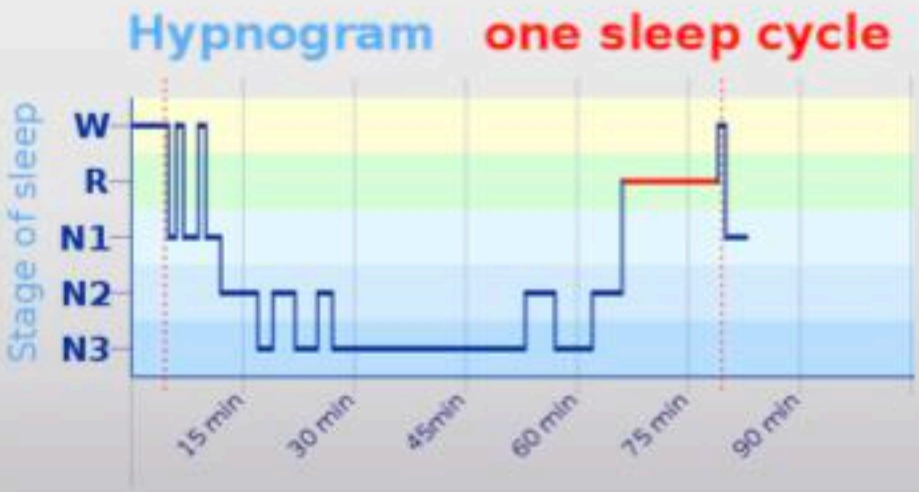
Start Age 7

Planas Tracks
Lingual Light Wire

Age 8
9 Months from start



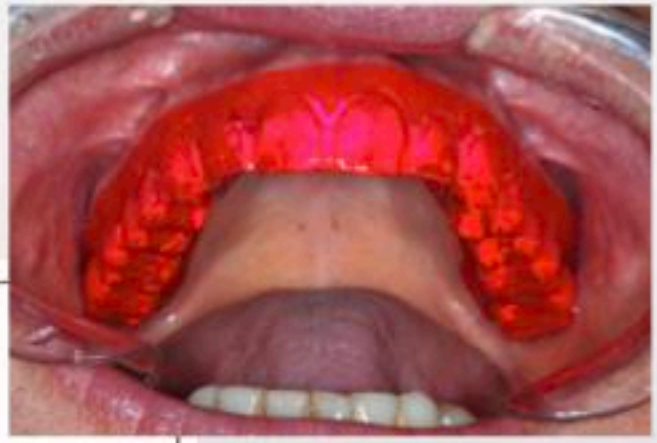

Cycles of Sleep
DREAMITALE
Sleep Stages
FALL ALSEEP
STAGE 1 (Lightest Sleep)
STAGE 2
STAGE 3
STAGE 4 (Deepest Sleep)
One Sleep Cycle
(Notice how REM stage grows longer)
WAKE
REM
NREM
REM = Rapid Eye Movement
NREM = Non-REM
0 1 2 3 4 5 6 7 8 HOURS

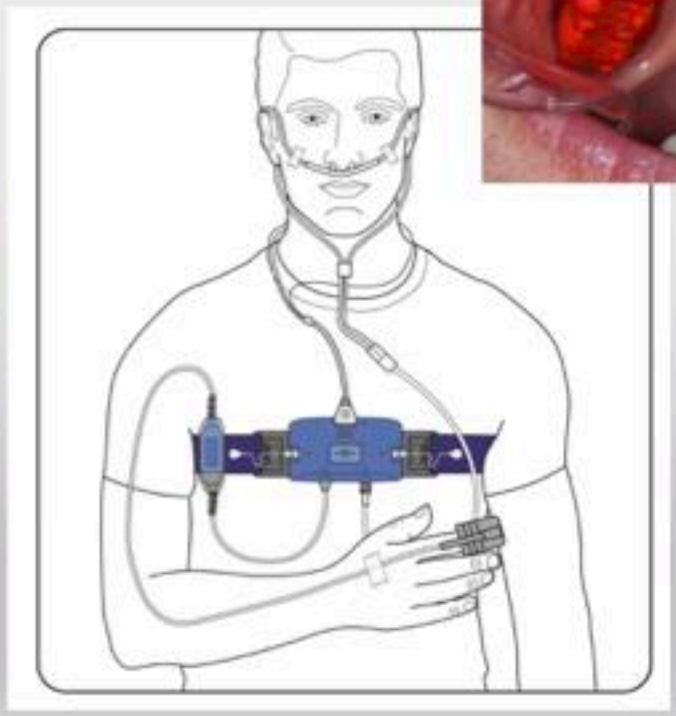

Hypnogram
one sleep cycle
Stage of sleep
W
R
N1
N2
N3
15 min
30 min
45min
60 min
75 min
90 min

zMachine

GENERAL sleep

zMachine + Brux Checker
+ Snore Lab





Call (888) 330-4424

Use Code: DROTER to receive special offer

Patient: M Y
Study Date: 2018-09-27 Study ID: 1124990976
3% Threshold

AHI: 8.9
AHI is how many times an hour your blood oxygen goes down.

RDI: 8.9
RDI is how many times an hour your sleep is disturbed due to respiration

Date of Birth: 1998
Age: 20
Sex: F

Height: 63 Inches
Weight: 105 Pounds
BMI: 18.60

Note:

GENERAL sleep
Zmachine® Synergy
Home Sleep Test Report
Study Ordered by:
John R. Droter, DOS
Scored by: Computer

Study Details: Computer Generated Scoring
The following parameters were recorded using a Zmachine Synergy (General Sleep Corporation): EEG for sleep staging & arousals; respiratory inductance plethysmography for thoracic respiratory effort; pressure transducer for respiratory airflow & snore; pulse oximeter for SpO2, pulse, & optical plethysmograph; and tri-axis accelerometer for body position. Hypopneas were scored per AASM recommended definition of 3% desaturation.

Times and Durations	
Lights off	2018-09-27 01:47:32
Lights on	2018-09-27 08:42:54
Total Recording Time (TRT)	936.8 min.
Time in Bed (TIB)	414.0 min. (81.7% of TRT) | 6 hours 54 minutes
Total Sleep Time (TST)	396.8 min. (95.9% of TIB)
Sleep Efficiency (SE)	95.9 % of TIB
Latency to Persistent Sleep (LPS)	8 min
Latency to Deep Sleep (LDEEP)	19 min
Latency to REM Sleep (LREM)	8.5 min
Total Light Sleep Time N1+N2	207.9 min. (52.4% of TST)
Total Deep Sleep Time N3 SWS	85.7 min. (34.1% of TST)
Total REM Time	83.2 min. (33.5% of TST)
SpO_2 < 89% cumulative time	0 min.
SpO_2 < 89% longest span	0 min.

Awakenings During Sleep	
Wake After Sleep Onset (WASO)	13 min
≥ 1-Epoch Awakenings	18 (2.7 per sleep hour)
≥ 3-Epoch Awakenings	0 (0 per sleep hour)

WASO is the cumulative wake time following LPS; ≥ 1-Epoch Awakenings is the number of times the patient woke for one epoch (i.e. 30 seconds) or more after LPS; and ≥ 3-Epoch Awakenings is the number of times the patient woke for three epochs or more after LPS (this is a subset of ≥ 1-Epoch

Sleep Study Ranges of Normal
Sleep Latency 10-20 min
Latency to REM 90 min
Sleep Efficiency >85%

N1 2% - 5%
N2 45% - 55%
N3 Deep Sleep 10% - 20%
If 8th: then 48 min. to 96 min
REM Sleep 20% - 25%
If 8th: then 96 min. to 120 min

REM to REM is about 90 min
4-5 cycle per night
REM time longer as night goes on

Deep N3 SWS slow wave sleep in first third of night. Less as we age

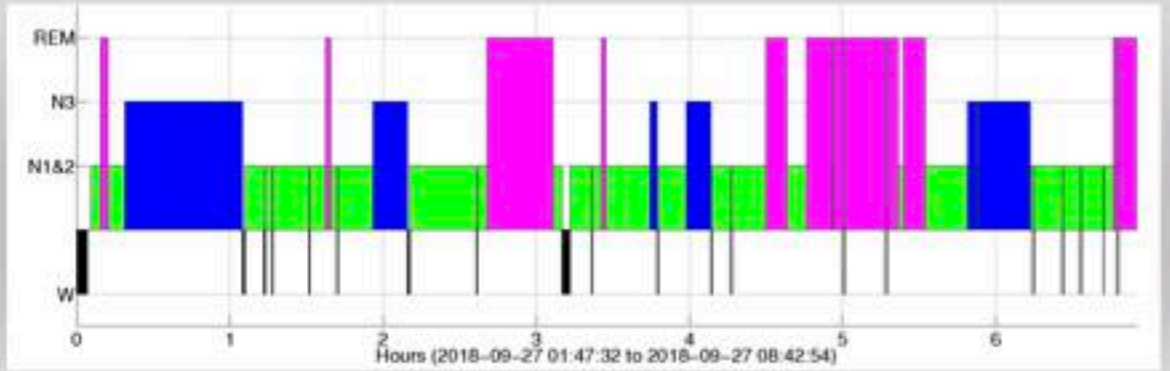
TRT is the total duration of the recording, TIB is the elapsed time from lights off to lights on; TST is the cumulative time scored as any stage of sleep; SE is 100x(TST÷TIB) expressed as a percentage; AHI is apneas + hypopneas per hour of sleep time; RDI is apneas + hypopneas + RERAs per hour of sleep time; and REI is apneas + hypopneas + RERAs per hour of recording time.

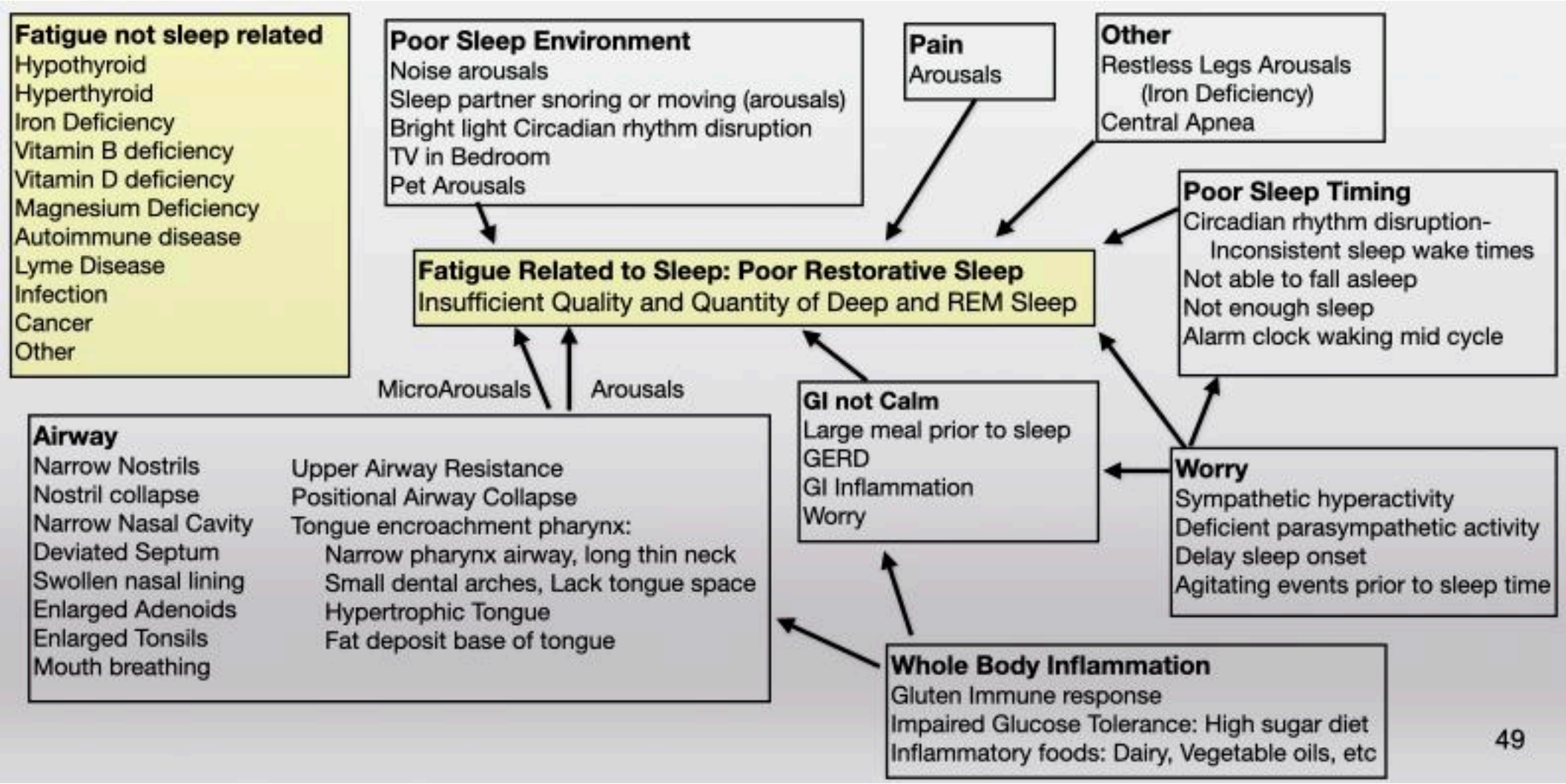
LPS is the elapsed time to the beginning of the first period in which 10 of 11 minutes are scored as any stage of sleep (i.e. the start of persistent sleep); LDEEP is the elapsed time to the beginning of first epoch of Deep Sleep; and LREM is the elapsed time to the beginning of first epoch of REM.

Respiratory Events

Body Position		
72.1%	Supine/hr	9.0
0%	Prone/hr	0
12.9%	Left/hr	4.5
14.8%	Right/hr	9.8

Sleep Stages




Fatigue not sleep related
Hypothyroid
Hyperthyroid
Iron Deficiency
Vitamin B deficiency
Vitamin D deficiency
Magnesium Deficiency
Autoimmune disease
Lyme Disease
Infection
Cancer
Other
Poor Sleep Environment
Noise arousals
Sleep partner snoring or moving (arousals)
Bright light Circadian rhythm disruption
TV in Bedroom
Pet Arousals
Pain
Arousals
Other
Restless Legs Arousals
(Iron Deficiency)
Central Apnea
Poor Sleep Timing
Circadian rhythm disruption-
Inconsistent sleep wake times
Not able to fall asleep
Not enough sleep
Alarm clock waking mid cycle
Fatigue Related to Sleep: Poor Restorative Sleep
Insufficient Quality and Quantity of Deep and REM Sleep
MicroArousals
Arousals
GI not Calm
Large meal prior to sleep
GERD
GI Inflammation
Worry
Worry
Sympathetic hyperactivity
Deficient parasympathetic activity
Delay sleep onset
Agitating events prior to sleep time
Airway
Narrow Nostrils
Nostril collapse
Narrow Nasal Cavity
Deviated Septum
Swollen nasal lining
Enlarged Adenoids
Enlarged Tonsils
Mouth breathing
Upper Airway Resistance
Positional Airway Collapse
Tongue encroachment pharynx:
Narrow pharynx airway, long thin neck
Small dental arches, Lack tongue space
Hypertrophic Tongue
Fat deposit base of tongue
Whole Body Inflammation
Gluten Immune response
Impaired Glucose Tolerance: High sugar diet
Inflammatory foods: Dairy, Vegetable oils, etc

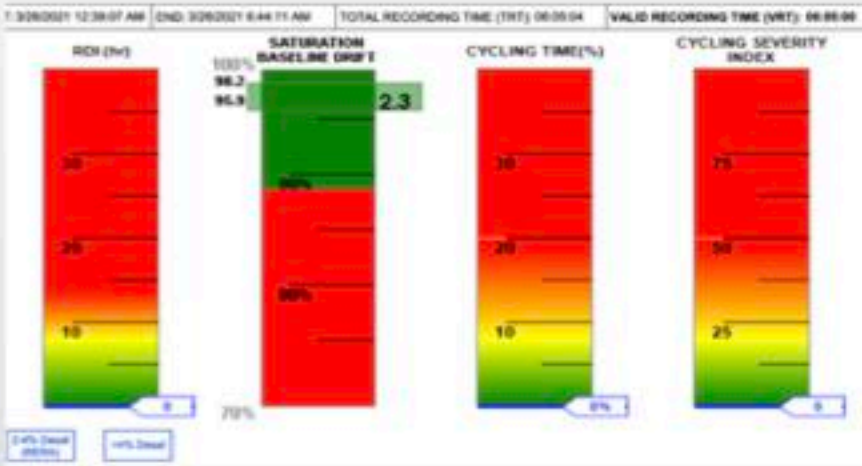
Sleep Simplified

1. Need adequate Deep and REM Sleep every night.
2. Need to get oxygen through the nose to lungs, unimpeded, all the time.
3. Parasympathetic Dominance in non REM Sleep

Sleep Complexity:
- Problems are Numerous.....
- Tests are Numerous.....
- Therapies are Numerous.....

Always go to the back to basics:
- 60+min Deep and 90+min REM
- Air from Nose to Lungs
- Large periods of calm, steady heart rate

Sat Screen by Patient Safety Inc



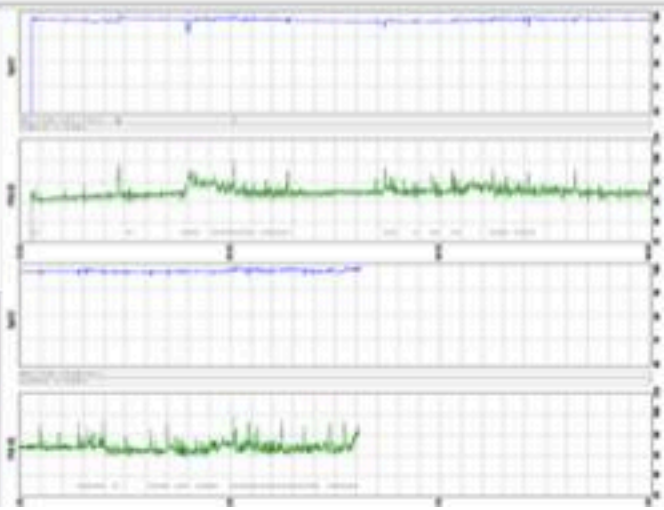
PULSE RATE DATA

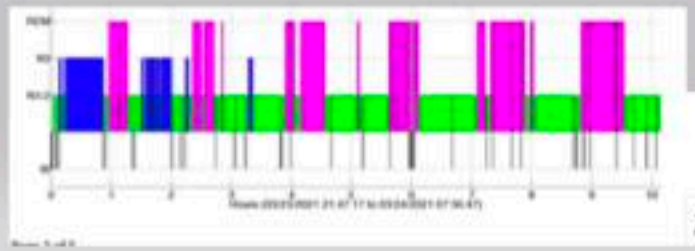
Autonomic Arousals

Index (#/hr): 23

Pulse Rate Range

Mean:	69
Min:	58
Max:	102





AHI: 0.5

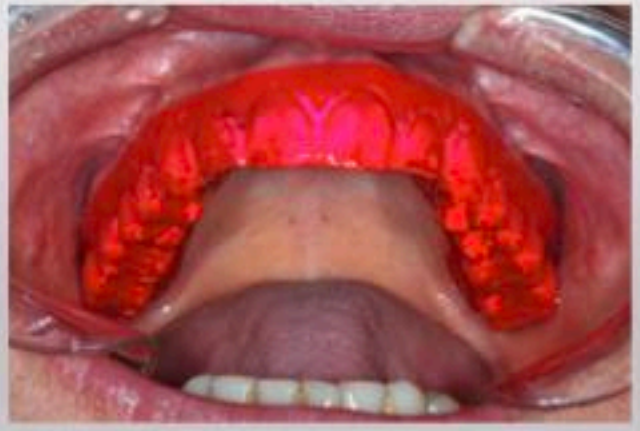
AHI is how many times an hour your blood oxygen goes down.

zMachine: Interrupted Deep and REM

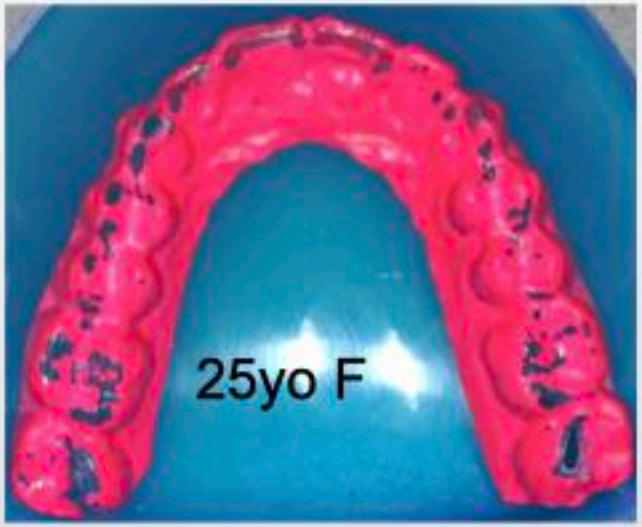
Does grinding occur awake or asleep?

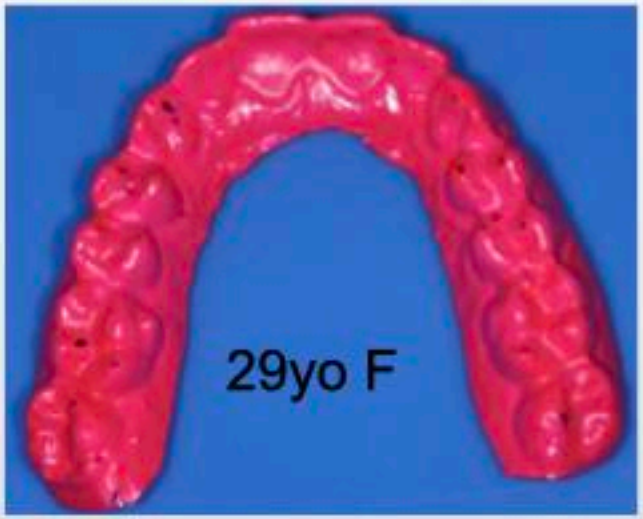
Brux Checker
Great Lakes Orthodontics

0.1mm Mylar



Made on Biostar Machine





Daytime Clenching- Clear Brux Checker

Increase awareness to break habit

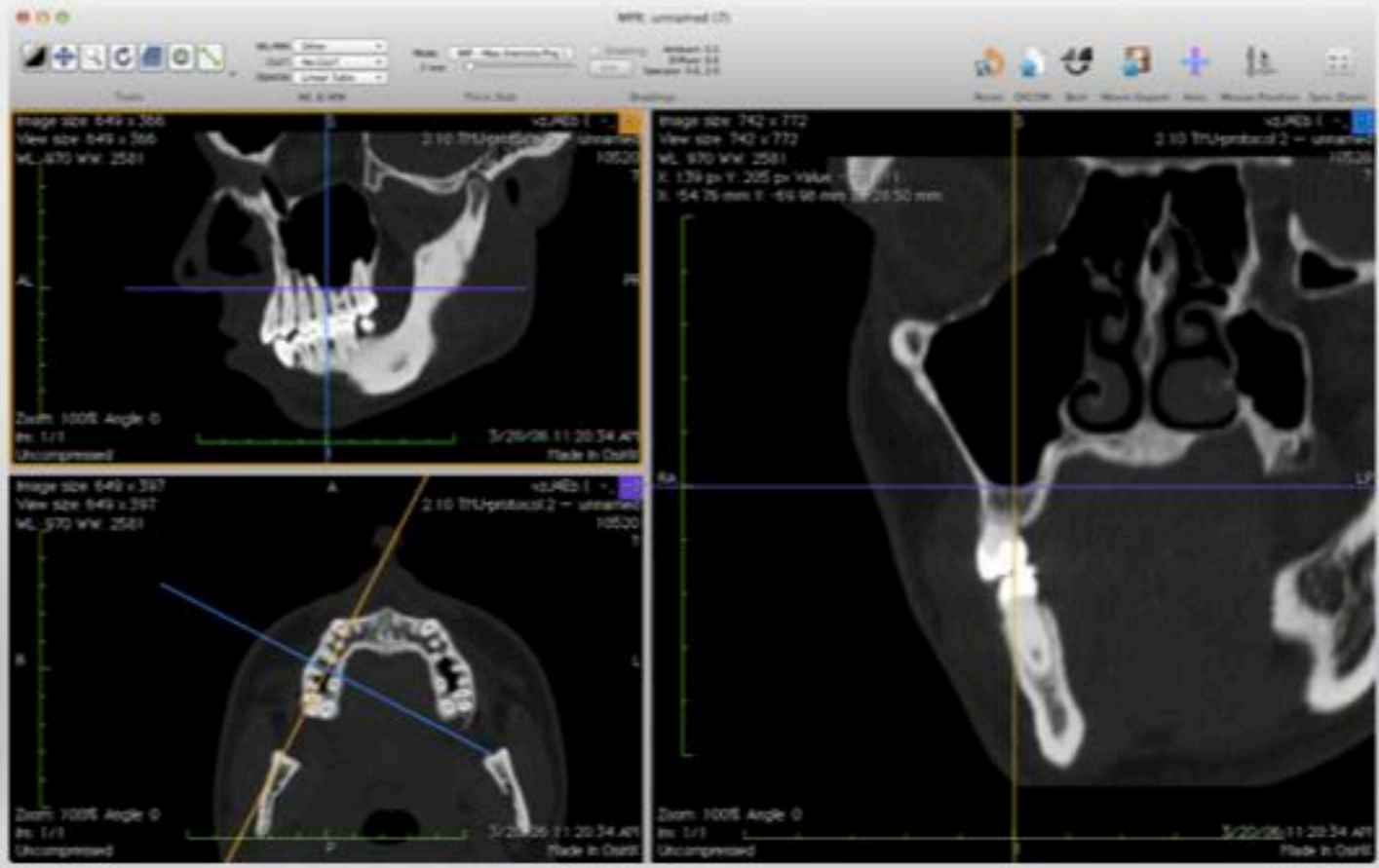
Very thin: Similar to mylar used for composites

Great Lakes Orthodontics
Biostar Platzhalterfolie
Item Ref 3202.1

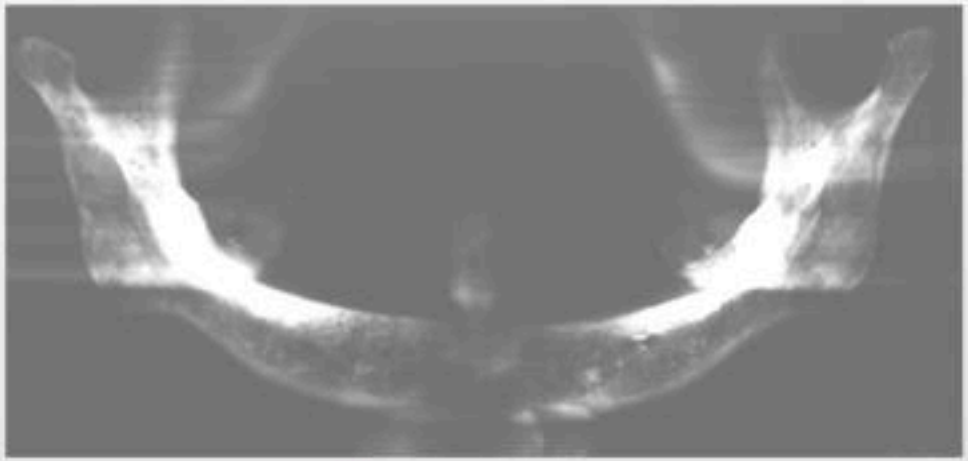
Facial Pain Diagnosis

Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. Anterior Stop Test
5. Sleep Airway Screening
6. **CT Scan**
   - MRI
   - Blood Tests

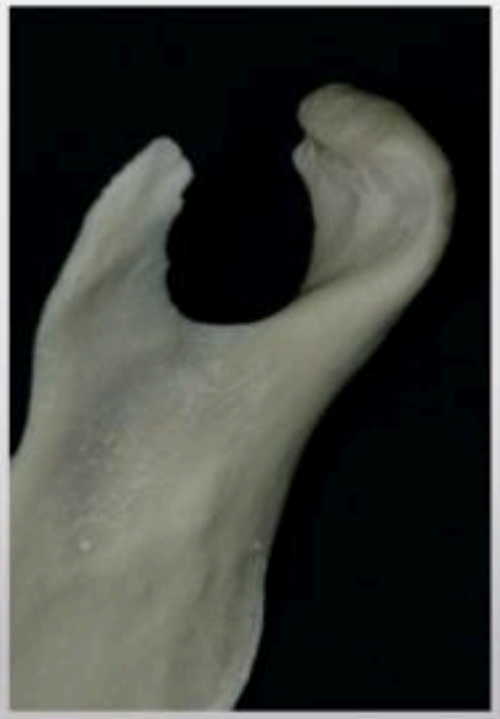


Pan-X of Skull Mandible



Note: This Mandible had plastic teeth added

Pan-X not Accurate



Fallon S, Fritz G, Laskin D, Panoramic Imaging if the Temporomandibular Jointa: An experimental Study Using Cadaveric Skulls. J Oral Maxillofac Surg 64:223-229, 2006

Computerized Axial Tomography (CT, CAT)

Spiral CT Scanner
12 sec acquisition Time

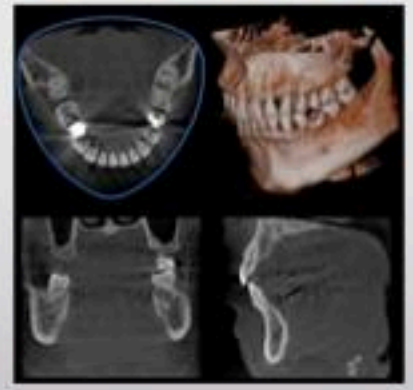
Note: prior to 2001 CT Scan took 25 min

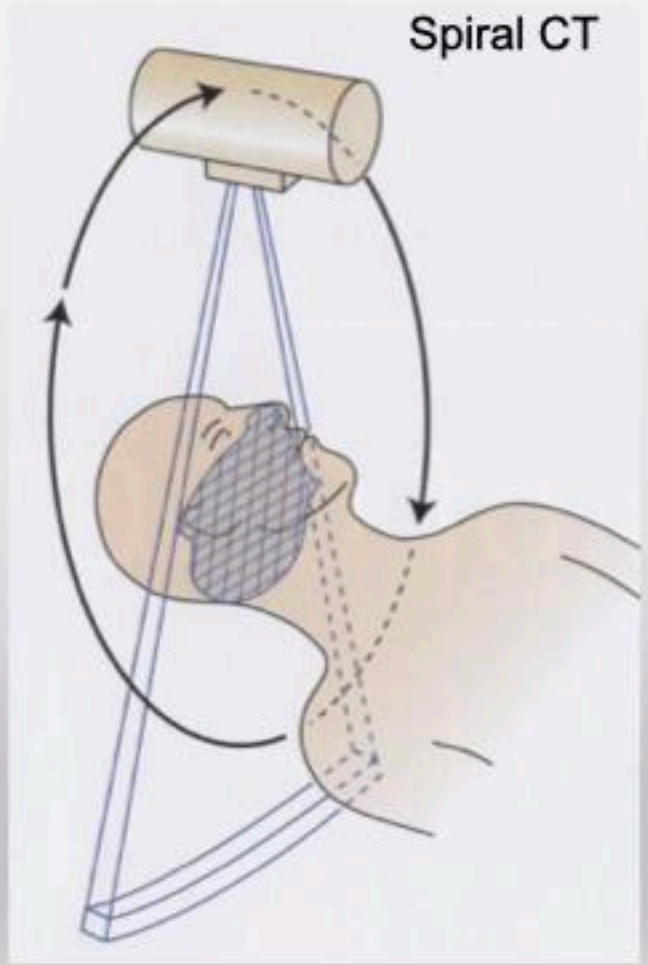
Cone Beam CT Scanner
20 sec acquisition time

vatech

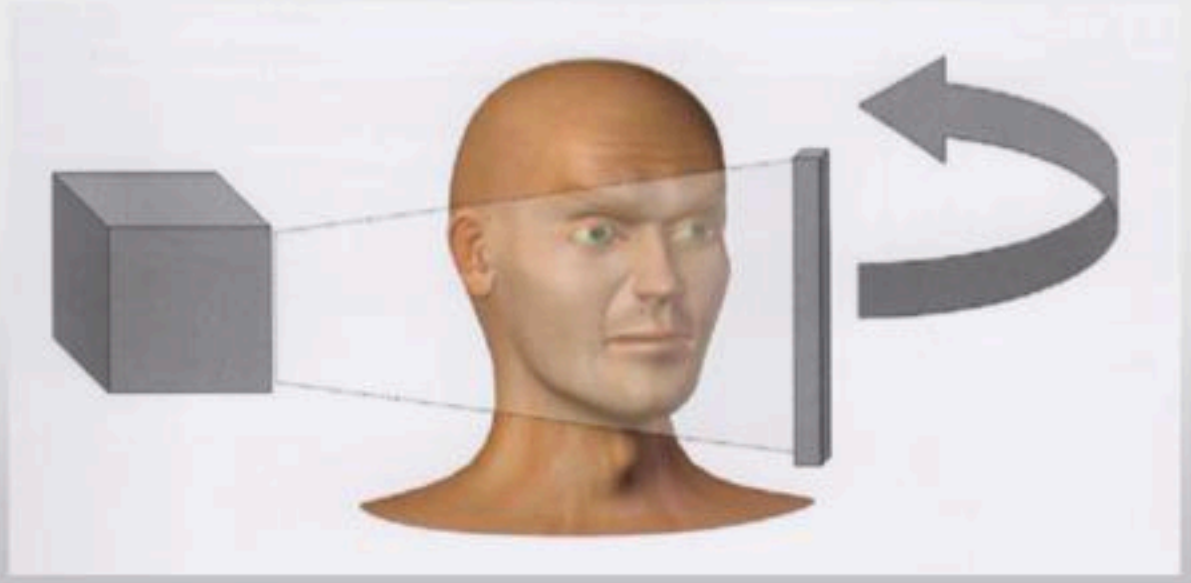
i3D Premium

iCAT





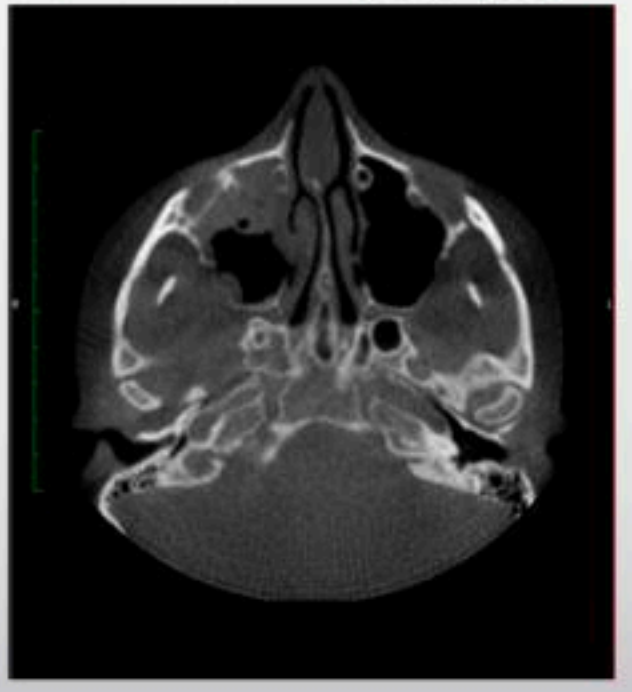
CBCT



Atlas of Cone Beam Imaging
Dale Miles DDS

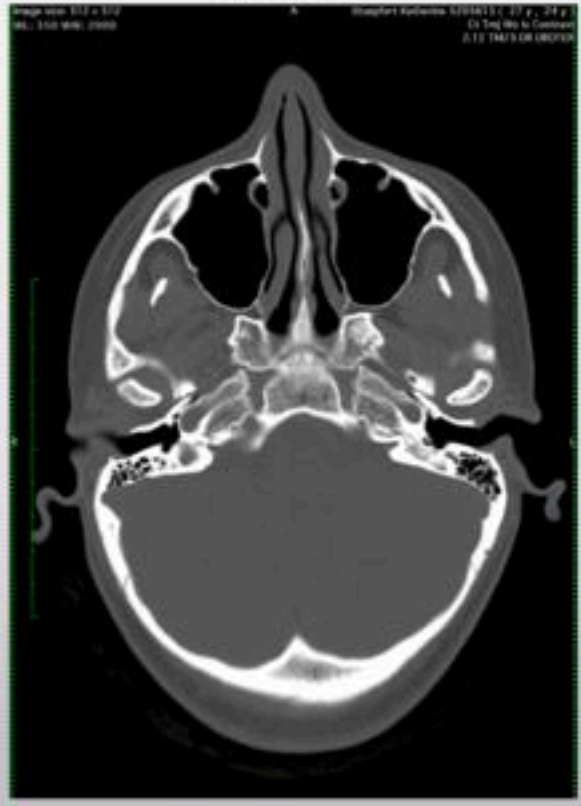
Compare CT scans

CBCT- iCAT



CBCT- Vatech i3D Premium

Spiral CT

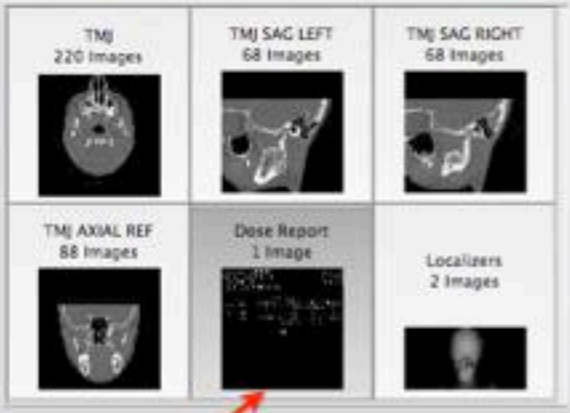


Best Contrast
Much more radiation

Radiation Exposure Comparison

Daily Background/day	0.008 mSv	
Panoramic	0.02 mSv	
1 Trans Atlantic Flight	0.03 mSv	
Chest Film	0.1 mSv	(0.1-0.2 mSv)
i-CAT Head	0.1 mSv	
Full Mouth Series Digital	0.12 mSv	
Full Mouth Series F Speed	0.17 mSv	
Conventional CT Head	0.5 mSv	
Spiral CT Head	2.7 mSv	
Daily Background/year	3.1 mSv/year	
Airline Crews (additional)	4.6 mSv/year	
Highest Safe Dose (public)	20 mSv/year	
Max Safe Exposure US Worker	50 mSv/year	
Exposure that can lead to Cancer	100 mSv/year	
Japanese Government Safe Level (After Fukushima 2011 Disaster)	250 mSv/year	

Comparison conversions done by John R Droter DDS
Gy converted to Sv using 1mGy/cm head = .0022mSv
Gy= Gray (Joules/kg)
Sv=Sievert (Joules/kg)



Spiral CT Dose Report → Dose Length Product
1244 mGy/cm x .0022 = 2.7 mSv

Spiral CT 27x more than CBCT, but about half of airline crews yearly exposure.
Radiation is cumulative over lifetime.
Safe dose of a harmful substance?
MRIs have no Radiation.

Normal TMJ- Bone

Bone Density

- Intact Cortex
- Even pattern Trabecular bone

Normal Size/Shape Condyle/Fossa

- Ovoid Condylar Shape
- Non-Congruent Condyle/Fossa
- Condyle 70% Size Fossa

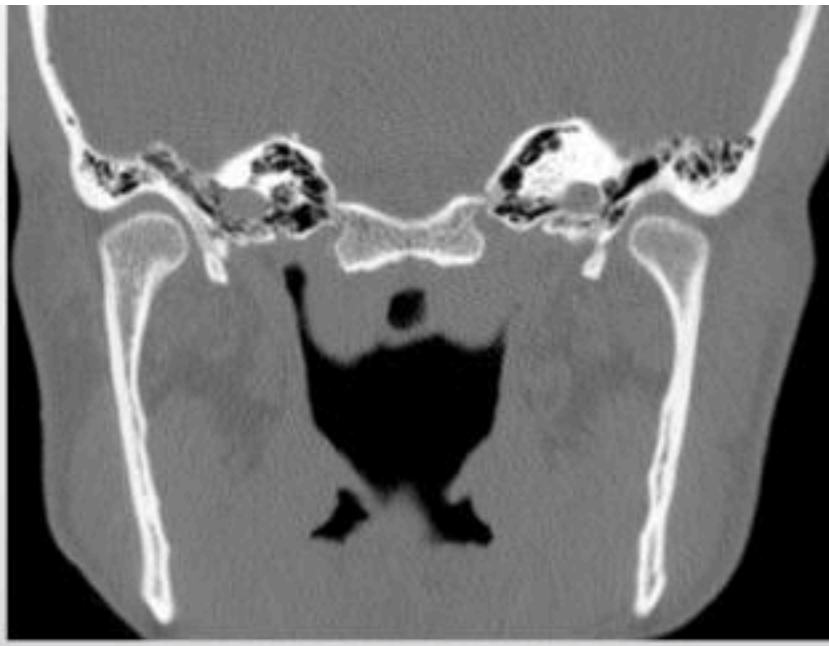
Condyle Centered in Fossa

- Coronal and Sagittal
- Room for Disc

Stable CR load Zone

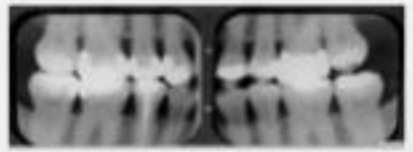
- Condyle closest to fossa

CT Scan
Coronal View

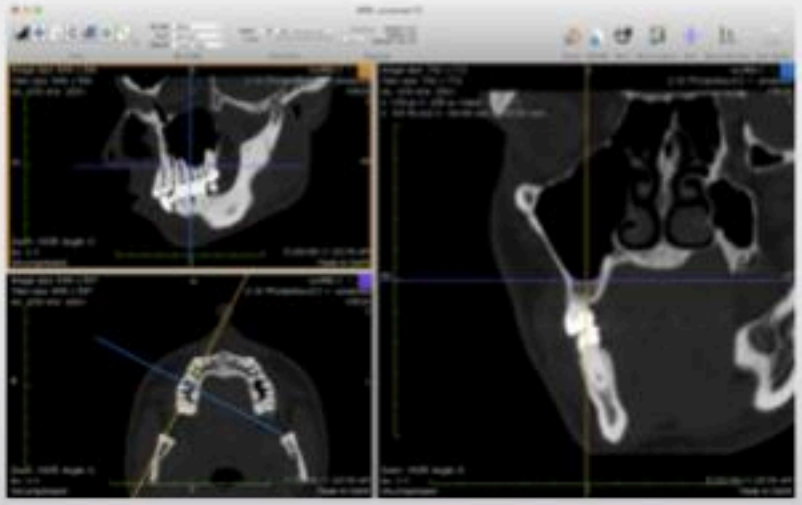


CT Scan
Sagittal View

Would you do full mouth rehabilitation with only a set of bitewing radiographs?



If you need to see all of the tooth surfaces,
why would you not want to see all of the TMJ surfaces?



Which do you use:

- FMX, PanX
- FMX, CBCT
- ✔ CBCT, 4bw, 4pa anterior

2.5x more PAP found w/ CBCT

Patel S, Wilson R, Dawood A, Mannocci F., Detection of periapical pathology using intraoral radiography and cone beam computed tomography. Int Endod J. 2011 Dec.

Endodontic lesion bacteria found in blood clots of Myocardial Infarctions

Pessi T1, Karhunen V. Bacterial signatures in thrombus aspirates of patients with myocardial infarction. Circulation. 2013 Mar. PMID: 23418311

CBCT

John R Droter DDS
Annapolis, Maryland

Key Features for TMJ Images

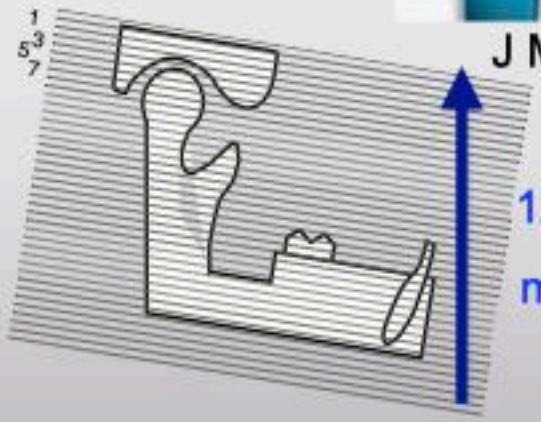
Large Field of View 15cm Tall (12cm is minimum)
Excellent raw image quality

J Morita

VaTech

Recommend Best Raw Image Quality:
3D Accutomo 170 J Morita 12cm
VaTech i3D Premium 19cm

Most important is service behind the product
Benco vs others



Not recommend:
Any Sirona including Galileos: Marginal raw image quality, motion artifact

Green = LOW Contrast

Making a Great TMJ Scan

Rx for CBCT

Can get from JRDroter.com

Adding a chair vastly improves image quality

1. LargeField of View
15cm tall field of view or greater
At 12cm tall you will miss some joints. 15cm and up is better
Note: 17cm x12 cm is 12 cm tall. The smaller # is the height, and is listed last

2. Scan Area
Scan Area to include 1cm above condylar head,
1 cm behind condylar head and 1 cm below chin.

3. KVP and AMP
Use highest KVP and Amperage the machine allows to get best contrast.

4. Voxel Size
Lesser scan time minimizes movement artifact. 0.3 voxel will give a better image than 0.1 voxel

5. No Metal-
No hair ties/clips, facial piercings, partials, glasses, etc.

6. Natural Neck Posture
Side view: Neck in natural postural alignment, and Frankfurt horizontal plane parallel to the floor. Avoid reaching for chin-rest with head forward posture.
Align head frontal view: Laser aligner down middle of face, can see both ears equally

7. Hold Still
Goal: Patient to hold very, very still for 20 seconds while scan is being taken
Sitting is more stable than standing. A hard chair works well.
Practice swallowing, back teeth touching, tongue lightly resting back of front teeth.
Practice lightly breathing.
Give patient a 7 second warning before you take the scan so they can swallow, get back teeth touching, and have tongue lightly resting back of front teeth.

Normal TMJ- Bone

Bone Density

- Intact Cortex
- Even pattern Trabecular bone

Normal Size/Shape Condyle/Fossa

- Ovoid Condylar Shape
- Non-Congruent Condyle/Fossa
- Condyle 70% Size Fossa

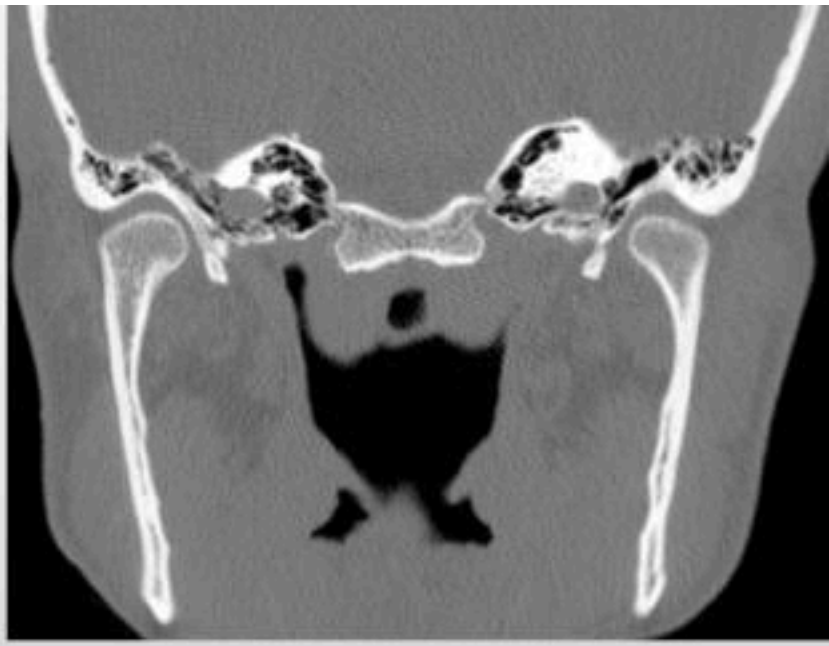
Condyle Centered in Fossa

- Coronal and Sagittal
- Room for Disc

Stable CR load Zone

- Condyle closest to fossa

CT Scan
Coronal View



CT Scan
Sagittal View

Interpreting CBCT

www.jrdroter.com

Review of Scan: CBCT

John R Droter, DDS

Name _____ Scan Date _____

Review Date: _____

Scan Quality: Good Fair Marginal

First do quick scroll through axial, coronal and sagittal for global impression.

Right TMJ Scroll Corrected Sagittal and Corrected Coronal

Condyle:	☐ Normal Size	☐ Small condylar size ☐
	☐ Normal Shape	☐ Altered condylar shape ☐
	☐ Cortex Intact	☐ Cortex not intact ☐
	☐ Cortex Even	☐ Hyperadolfication ☐
Fossa:	☐ Normal Size	☐ Small fossa size ☐
	☐ Normal Shape	☐ Flattened fossa shape ☐
	☐ Cortex Intact	☐ Cortex not intact ☐
Condyle Position	☐ Centered in fossa	☐ Condyle distalized ☐
Joint spacing	☐ Room for disc	☐ No room for disc ☐
CR Load Zone	☐ Superior medial	☐ Superior Lateral ☐
Estimate Piper:	R1 R2 R3a R3b R4a R4b R5a R5b	
Right TMJ Health:	☐ Healthy	☐ Damaged ☐ Active Degeneration ☐ Adapting ☐ Adapted

Left TMJ Scroll Corrected Sagittal and Corrected Coronal

Condyle:	☐ Normal Size	☐ Small condylar size ☐
	☐ Normal Shape	☐ Altered condylar shape ☐
	☐ Cortex Intact	☐ Cortex not intact ☐
	☐ Cortex Even	☐ Hyperadolfication ☐
Fossa:	☐ Normal Size	☐ Small fossa size ☐
	☐ Normal Shape	☐ Flattened fossa shape ☐
	☐ Cortex Intact	☐ Cortex not intact ☐
Condyle Position	☐ Centered in fossa	☐ Condyle distalized ☐
Joint spacing	☐ Room for disc	☐ No room for disc ☐
CR Load Zone	☐ Superior medial	☐ Superior Lateral ☐
Estimate Piper:	L1 L2 L3a L3b L4a L4b L5a L5b	
Left TMJ Health:	☐ Healthy	☐ Damaged ☐ Active Degeneration ☐ Adapting ☐ Adapted

Scrolling Coronal View, Sagittal View, Axial View

All Tissue:	☐ Right = Left:	☐ = Except _____
Look for tumors:	Brain, Muscle, Parotid Submand Gland, Hypertrophy	
All Bones:	☐ Right = Left	☐ = Except _____
Look for hyperadolfied or radiolucent areas, cysts		
Nasal (Sagittal, Cor)	☐ Open	☐ Restricted ☐ Deviated Septum ☐
Sinuses "	☐ Clear	☐ Thickened Lining ☐ Sinus Polyps ☐
Airway "	☐ Adequate	☐ Restricted ☐
Teeth (Sagittal, Cor)	☐ No PAP	☐ PAP # _____ ☐
(Axial)	☐ No Gross Caries	
Perio (Thick Sagittal)	☐ No Gross Perio Bone Loss	
Atlas XD	☐ Appears Centered	☐ Not Level with Skull Base ☐
C2, C3, C4 XD	☐ Aligned	☐ Misaligned
Max Maxil Relation	☐ Normal Sagittal	☐ Retrognathic ☐ Maxilla ☐ Mandible
Max Maxil Canting	☐ Normal Coronal	☐ Asymmetric Cant ☐ Maxilla ☐ Mandible

Impression:

Signature: _____

Review of Scan: CT/CBCT Guide

John R Droter DDS

TMJ

Condyle

Fossa

☐ Normal Size, Normal Shape, Cortex Intact

Condyle is 70% size of the fossa, with an ovoid shape. The condyle and fossa are noncongruent convex surfaces. The outer cortex of bone is a solid continuous line with no breaks. Look for areas of hyperadolfication which are indicative of excess load in that area or damage and repair. The right and left TMJs should be the same size.

Condylar Position

☐ Centered in fossa

The condyle should be centered in the fossa. A distalized condyle is indicative of either joint damage and disc dislocation anteriorly or heavy anterior tooth contact. An anteriorly positioned condyle is indicative of a large CR/CO discrepancy, usually associated with an adapted mandibular retrognathia.

Joint Spacing

☐ Centered in fossa

There should be room to "draw" a disc between the condyle and fossa.

CR Load Zone (Centric Relation Load Zone)

☐ Superior medial

Ideally the condyle in its optimal load bearing position (Centric Relation) should load on the superior medial surface. In the coronal view the area where the condyle is closest to the fossa is the Centric Relation Load Zone. A variant of normal is to have both condylar load on the superior lateral surfaces. If the load zones of the right and left do not match (i.e. one is medial the other lateral) this is indicative of joint damage and disc dislocation. Need to evaluate for joint mechanical stability (joint wobble) with a DJINS. Clinically these patients may have a hypermobile "bite".

Estimate Piper

This estimation combines clinical data from the clinical history, exam, joint palpation, stethoscope auscultation, Doppler, JVA(Joint Vibration Analysis) and the CT scan. If the you see a left distalized condyle and the left TMJ clinically clicks, my estimation would be a Piper 4a. A left distalized condyle and no clicking is either a Piper 4b or a health joint distalized due to heavy anterior contact (usually iatrogenic). In the case of the 4b, JVA would show some slight "scratch vibrations", where as a health TMJ distalized due to occlusion would show "smooth vibrations", and clinically have tremitus on the anterior teeth.

1 Normal joint- **MRI and CT are normal** (See all above). No joint sounds, full range of motion. JVA no vibrations, quiet Doppler.

2 The TMJ is damaged but disc is still in place so **MRI and CT are normal**. Usually the cartilage is damaged, roughened from parafunctional bruising. Doppler and JVA will both indicate slight vibrations. A well adapted 4b will also have the same vibratory signals as a Piper 2, but the 4b will show changes in condylar position on the CBCT, and the MRI will show the disc dislocation.

3a This a partial dislocation of the disc, usually in an anterior medial direction with the lateral ligament being torn or stretched. The joint reduces on opening and will make a vibration, either a click or wobble on JVA. If a 3a is opposite a health joint there is not a change in occlusion so **CT is normal**. A Piper 3a is often considered to a 4b. With loss of the opposing disc, the mandible shifts concavally, the CR load zone changes in both joints leading to 3a.

3b Same as above except nonreducing and therefore no clicking vibration. **CT is normal**

4a The disc is fully displaced off the head of the condyle and reduces on opening. There will be a shifting of the mandible which can be seen on the CBCT. **Condyle not centered in fossa.** Clinically there will "click or wobble" vibration as the disc reduces and subluxates. While most vibrations are in the audible range some may not be. These will be detected with JVA.

4b The disc is fully displaced off the head of the condyle and does not reduce on opening. This will look the same on CBCT as A. **4a. Condyle not centered in fossa.** While limited opening may occur, many can have a full range of motion. Range of motion should not be a sole determine factor on wether a joint is 4b.

5a Osteoarthritis There will be **changes to the condylar shape and cortex** seen on the CBCT. Osteoarthritis is the inflammatory phase of Osteoarthrosis. Look for missing cortex indicative of active degeneration. The joint will be tender to palpation. An MRI is helpful in detecting extent of inflammation.

5b Osteoarthrosis There will be **changes to the condylar shape and cortex** seen on the CBCT. The Cortex however will be intact and the joint will not be tender to palpation. Hyperadolfication will be seen having reinforced the damaged areas. There is a loss of congruency as the condyle and fossa wear down and become flattened. Parafunctional tooth grinding increases OA bone wear.

First do quick scroll through axial, coronal, and sagittal for global impression.

Right TMJ Scroll Corrected Sagittal and Corrected Coronal

Condyle:	☐ Normal Size	☐ Small condylar size	☐
	☐ Normal Shape	☐ Altered condylar shape	☐
	☐ Cortex Intact	☐ Cortex not intact	☐
	☐ Cortex Even	☐ Hypercalcification	☐
Fossa:	☐ Normal Size	☐ Small fossa size	☐
	☐ Normal Shape	☐ Flattened fossa shape	☐
	☐ Cortex Intact	☐ Cortex not intact	☐
Condyle Position	☐ Centered in fossa	☐ Condyle distalized	☐
Joint spacing	☐ Room for disc	☐ No room for disc	☐
CR Load Zone	☐ Superior medial	☐ Superior Lateral	☐

Estimate Piper: R1 R2 R3a R3b R4a R4b R5a R5b

Right TMJ Health: ☐ Healthy ☐ Damaged ☐ Active Degeneration ☐ Adapting ☐ Adapted

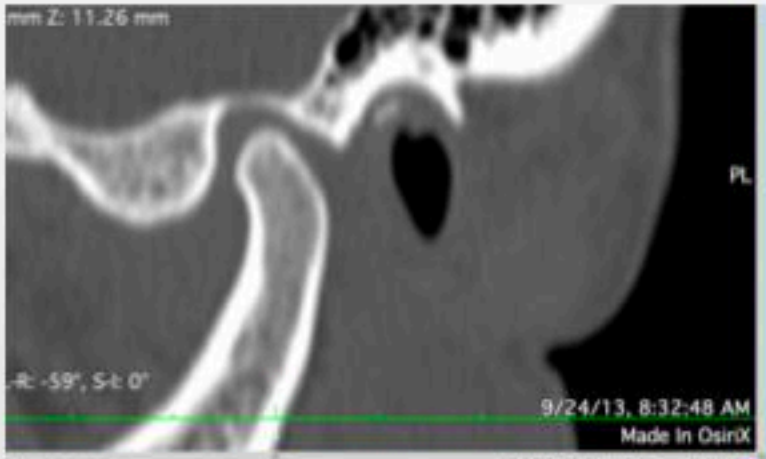
CT Left
Piper 2 from MRI

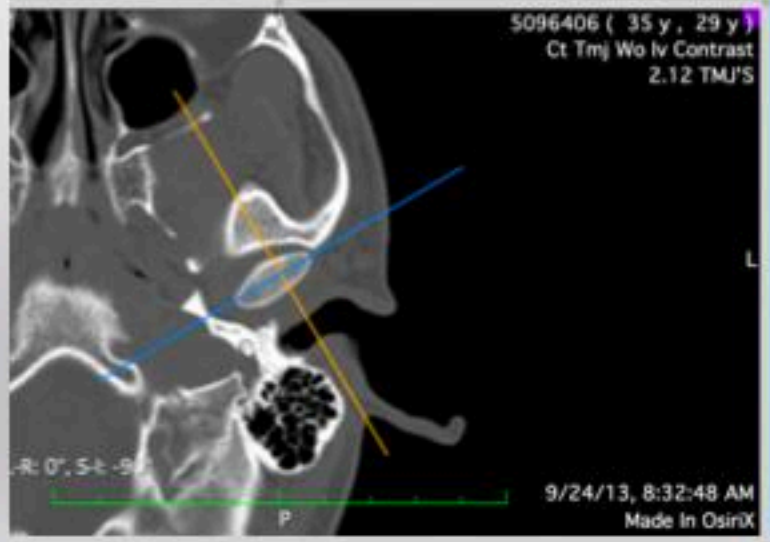
Condyle:	☑ Normal Size
	☑ Normal Shape
	☑ Cortex Intact
	☐ Cortex Even
Fossa:	☑ Normal Size
	☑ Normal Shape
	☑ Cortex Intact
Condyle Position	☐ Centered in fossa
Joint spacing	☑ Room for disc
CR Load Zone	☐ Superior medial

☑ Hypercalcification

☑ Condyle distalized

☑ Superior Lateral





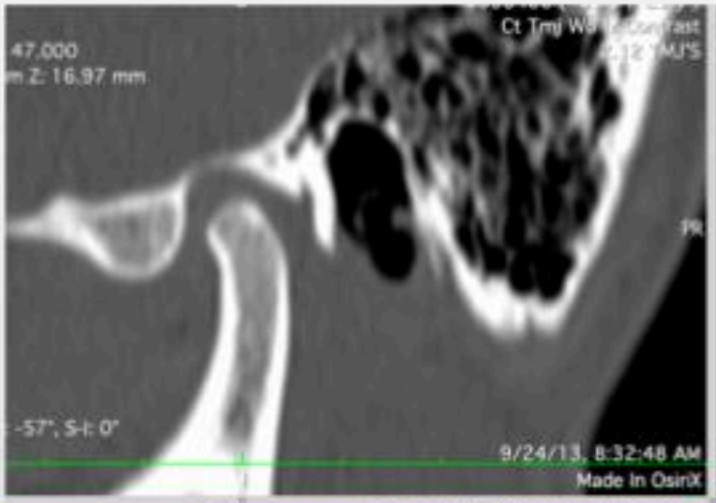
CT Right
Piper 4a-e from MRI

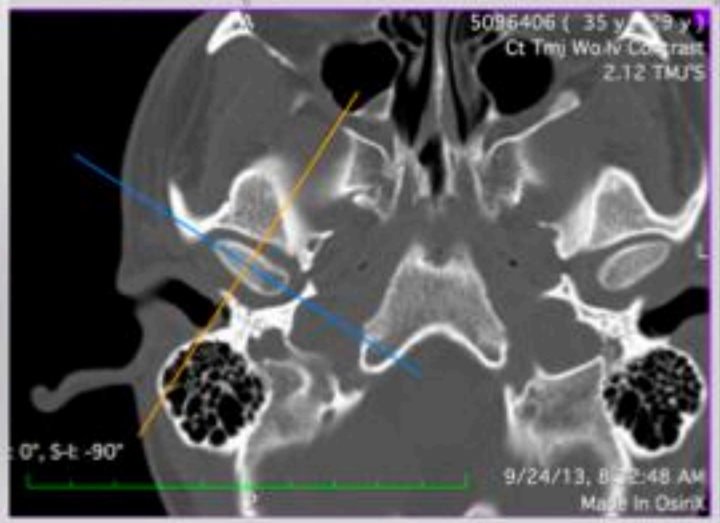
Condyle:	☑ Normal Size
	☑ Normal Shape
	☑ Cortex Intact
	☐ Cortex Even
Fossa:	☑ Normal Size
	☑ Normal Shape
	☑ Cortex Intact
Condyle Position	☑ Centered in fossa
Joint spacing	☑ Room for disc
CR Load Zone	☐ Superior medial

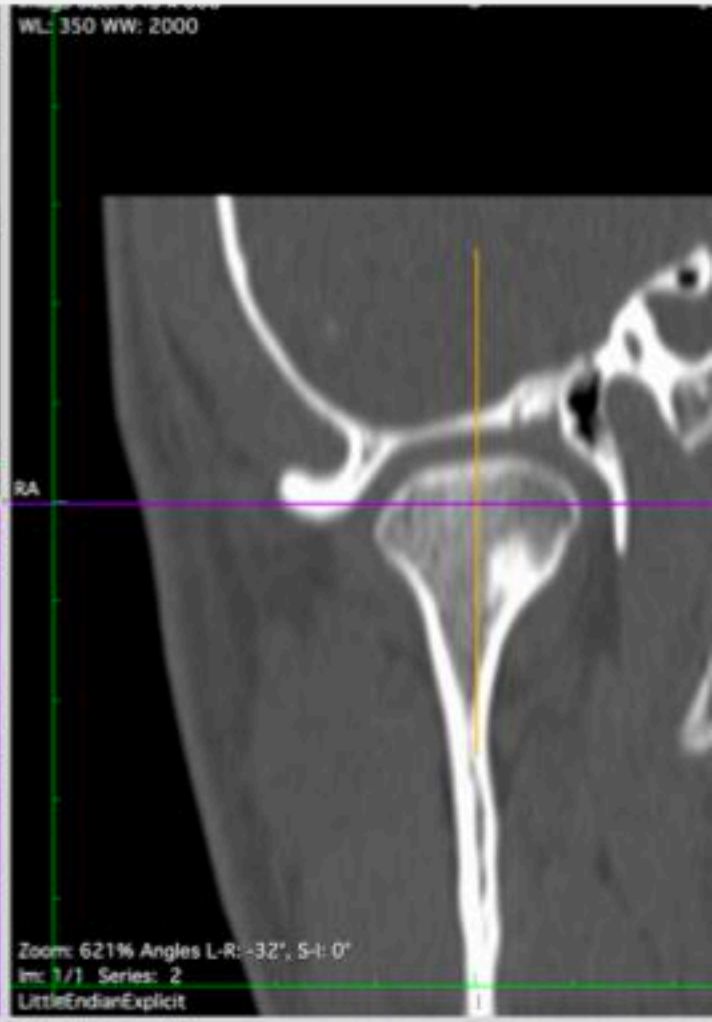
☑ Hypercalcification

☑ Superior Lateral

✔ Note: Large joint space





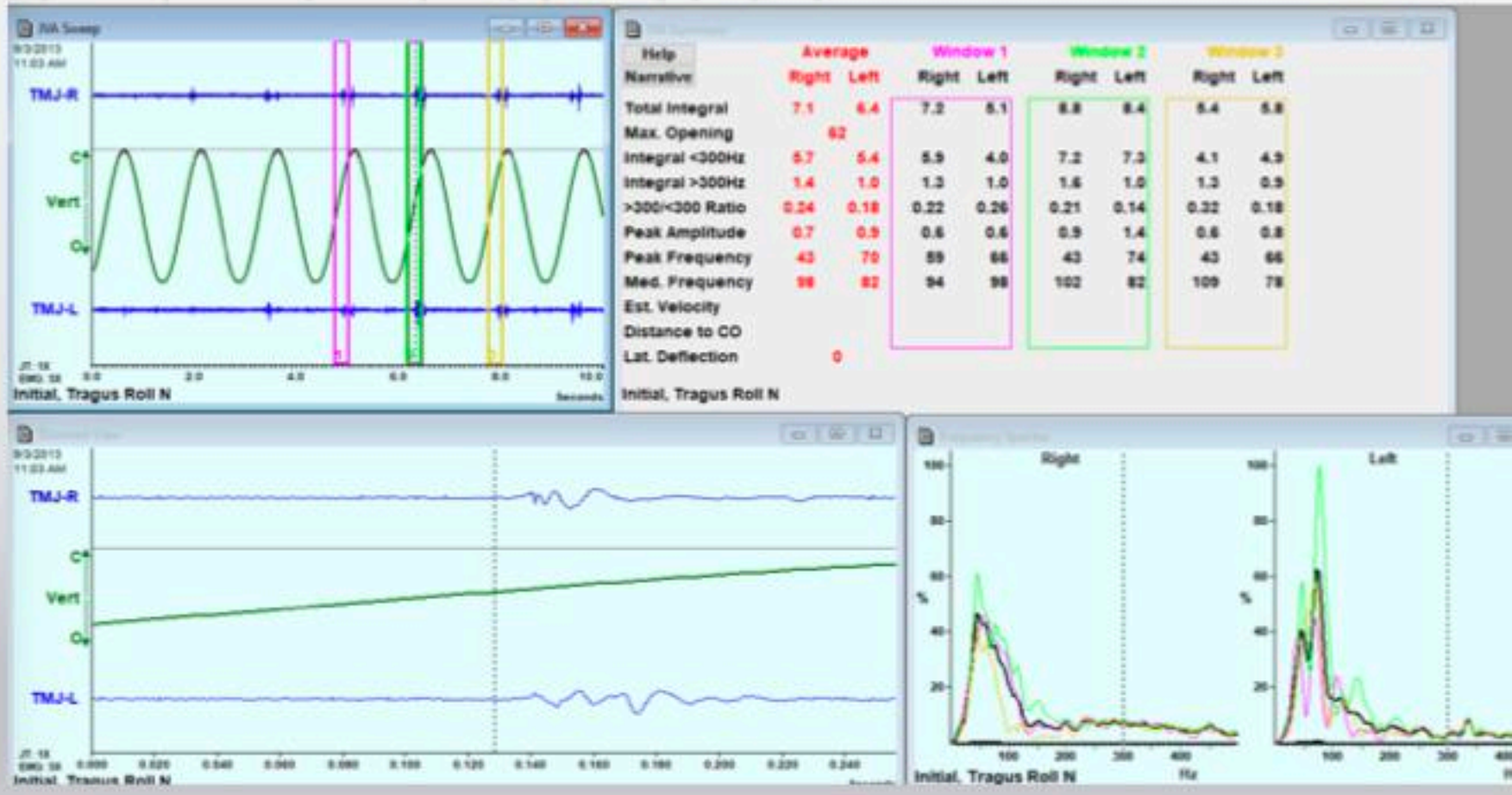


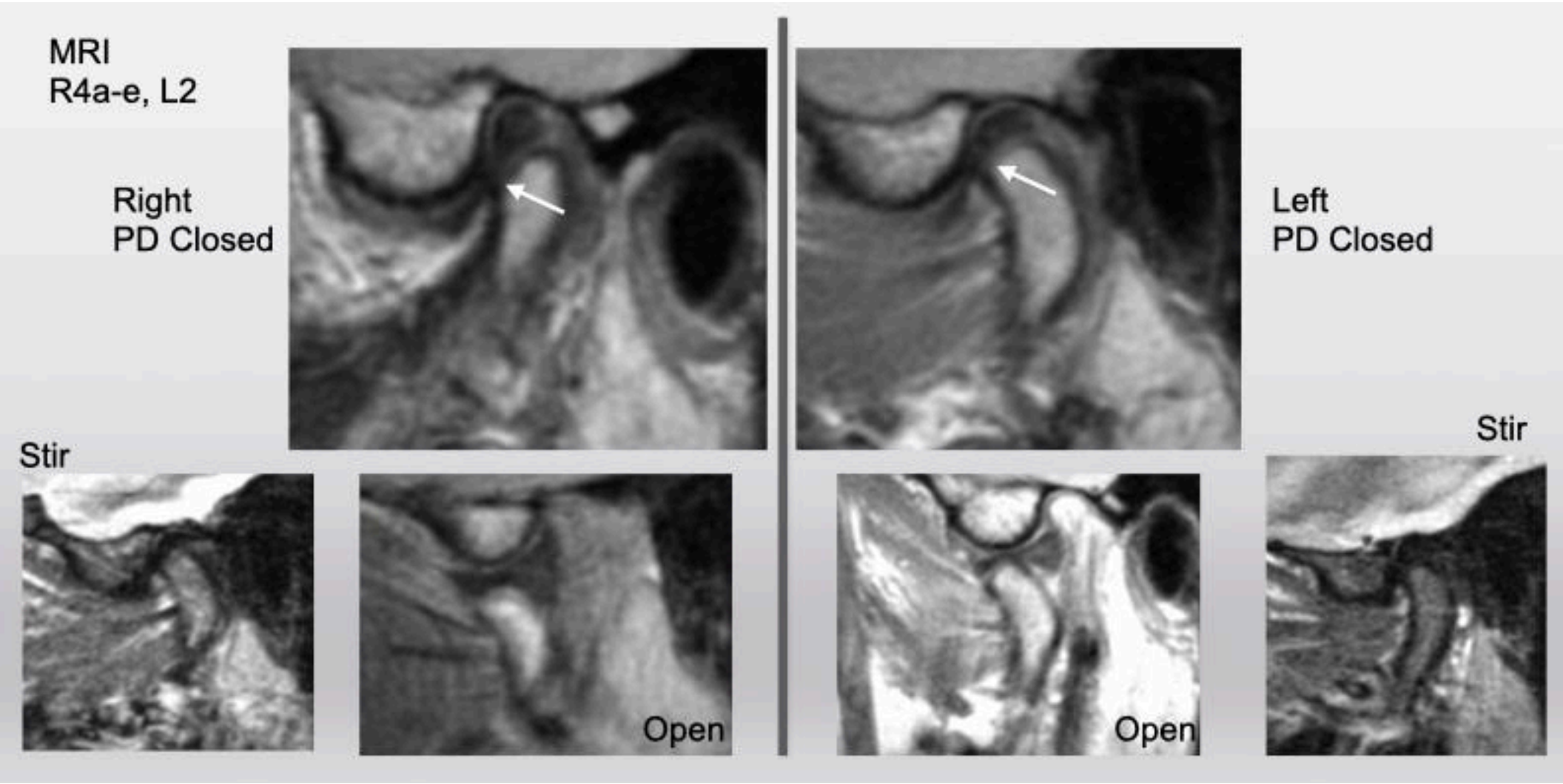
Slight Wobble before tooth contact

Joint subluxation on movement

Clinical Relevance?

Early damage from parafunction




MRI
R4a-e, L2
Right
PD Closed
Left
PD Closed
Stir
Open
Open
Stir

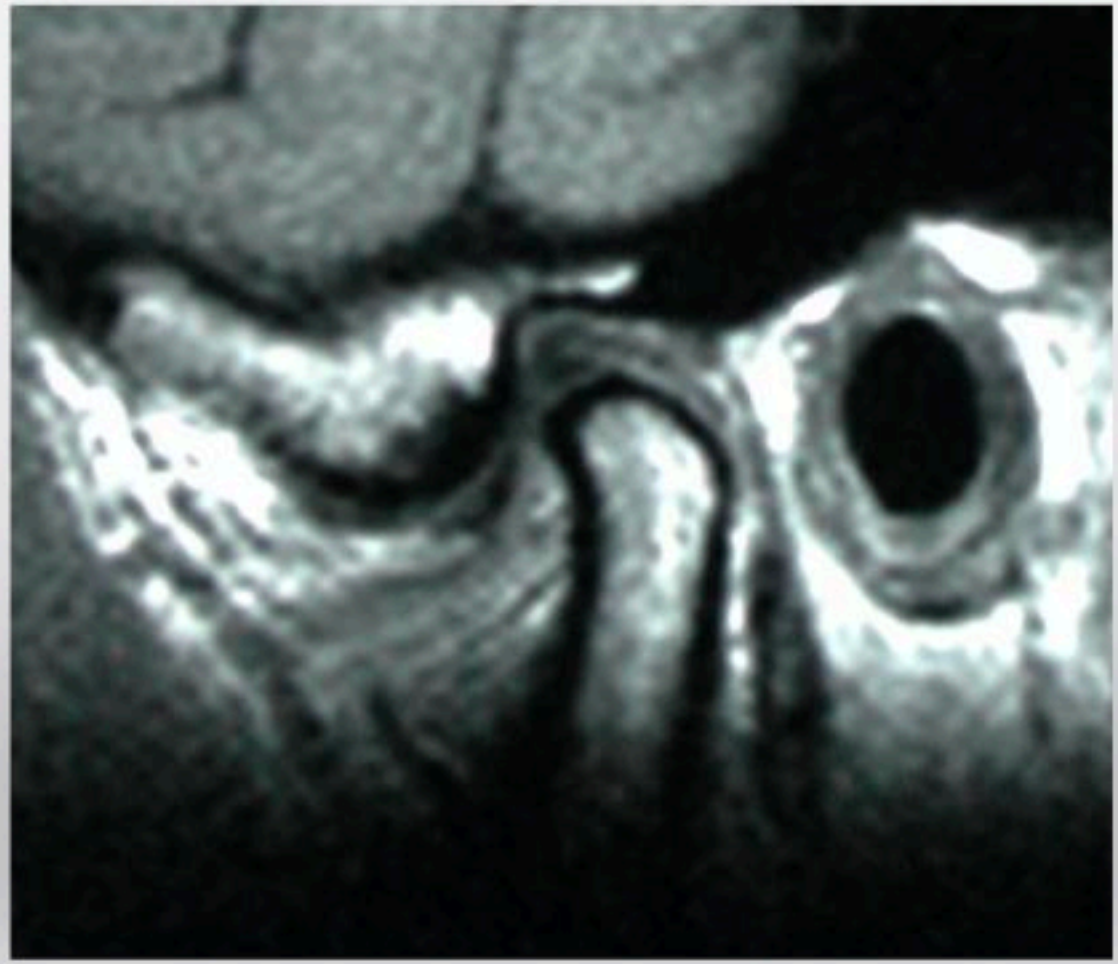
Facial Pain Diagnosis

Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. Anterior Stop Test
5. Sleep Airway Screening
6. CT Scan

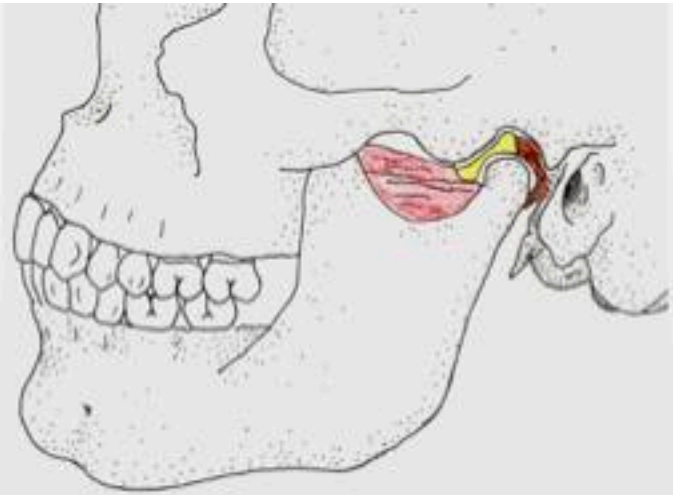
MRI

Blood Tests



MRI- T1 Oblique Sagittal View

MRI you can see soft tissue



Find the...

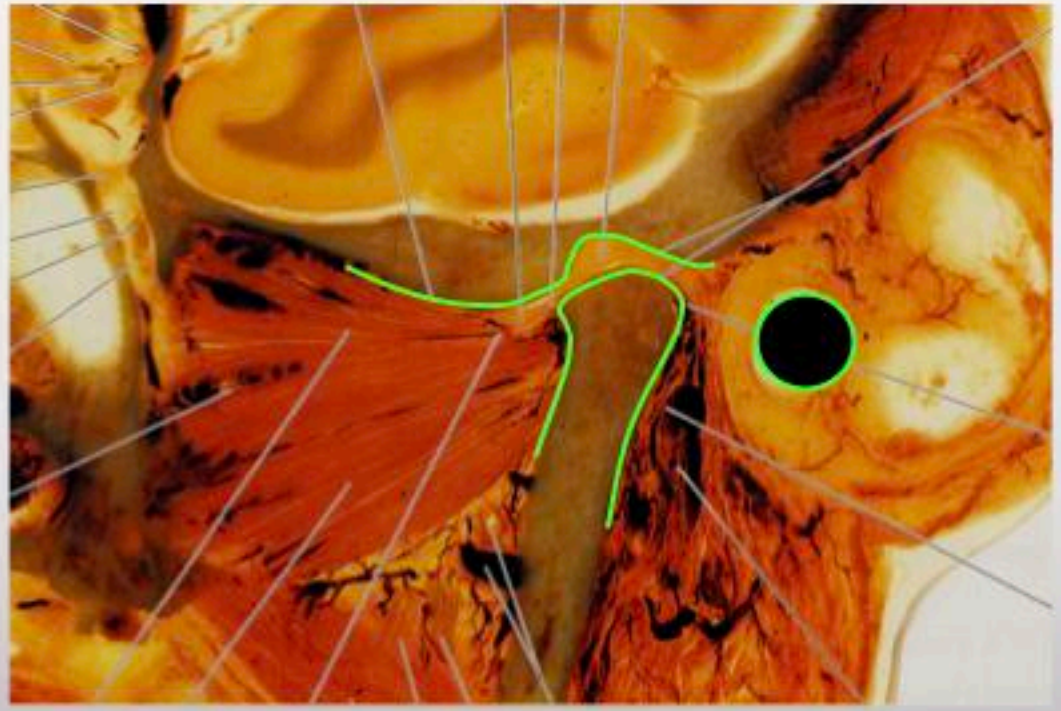
Ear

S-shaped Bone

Condyle

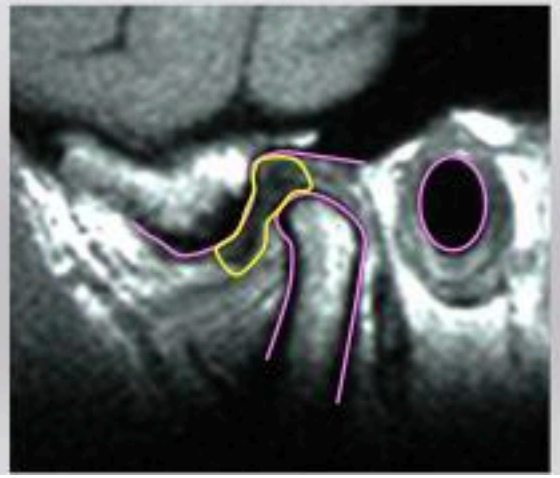
Disc

Oblique Sagittal View

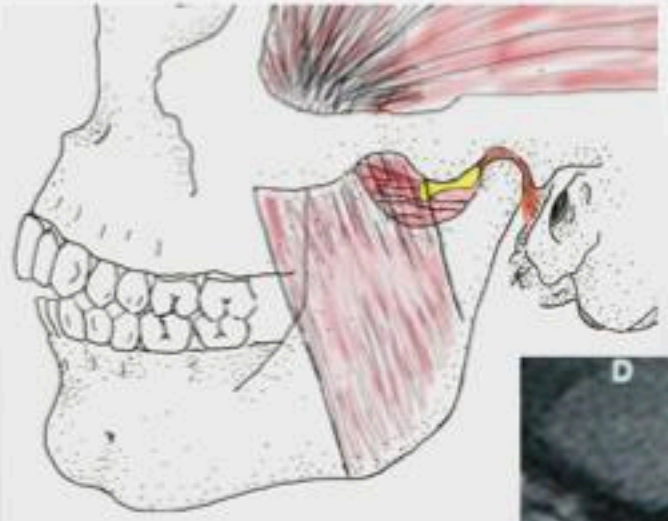


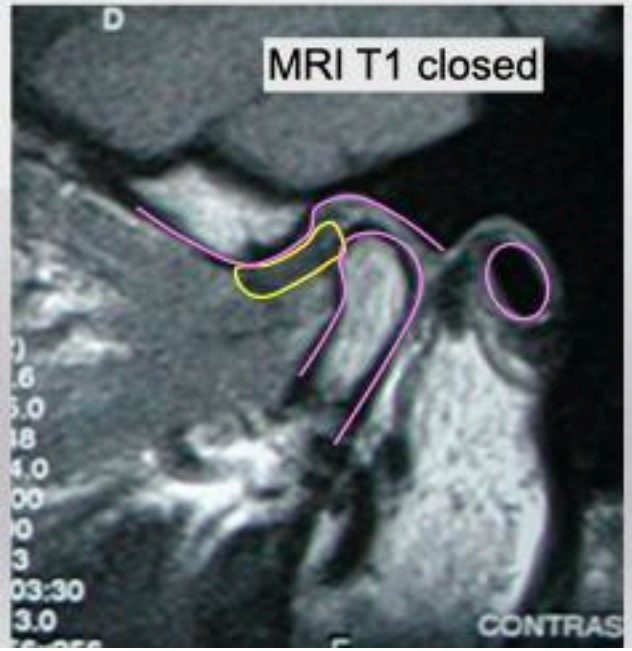
T1 Inverted

T1 Sagittal Closed



Dislocated Disc and Condyle Subluxation





open

MRI Scanners

MRI Scanner
1.5 Tesla
Magnet Strength

Open MRI Scanner
0.7 Tesla

Dual TMJ Coils

Shoulder Coil

How an MRI Works

Magnet lines up protons: Water and fat

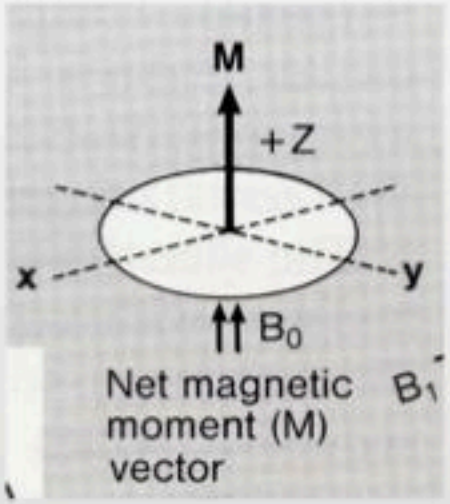
- Magnet is on the whole time

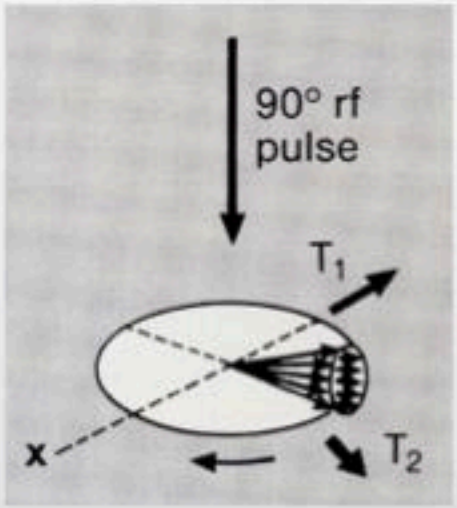
RF Pulse (Radiofrequency): 1 millisecond

- Knocks protons out of alignment

Time Constant: RF pulse off and then look

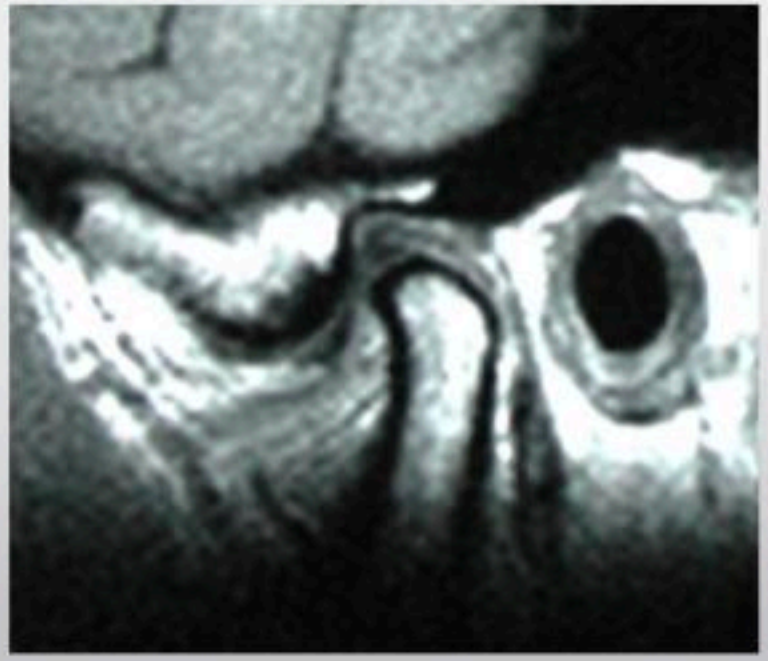
- T1 : Shows more fat
- T2 : Shows more water
- PD Proton Density- Between T1 and T2
- STIR Short T1 Inversion Recovery- Shows more water





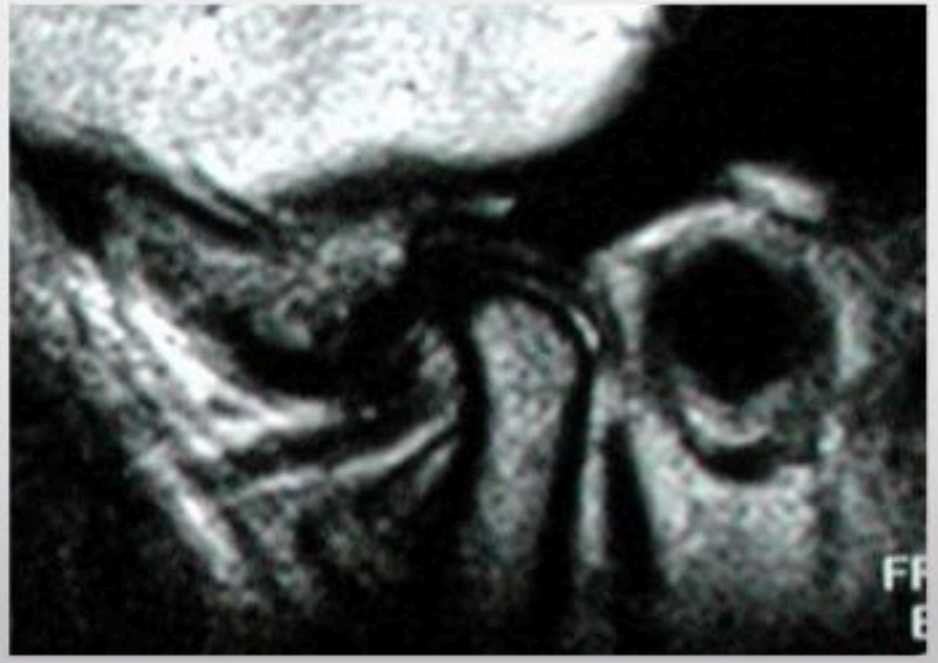
Normal MRI T1 and T2

T1 Sagittal Closed



T1 shows more fat

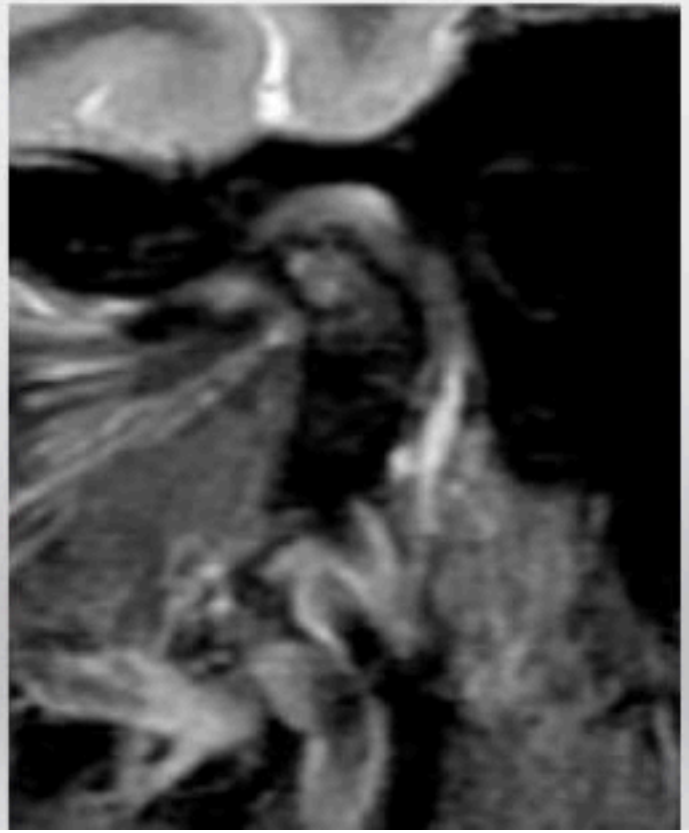
T2 Sagittal Closed



T2 shows more water:
Inflammation
Pathology

MRI STIR Image

STIR- Short T1 Inversion Recovery



STIR- "Supercharged" T2

Retrodiscal Inflammation

Marrow Edema

Diff Dx is active AVN, Osteoarthritis, Lyme Ds, RhA, Hypoxic Progressive Condylar Resorption

STIR and T2 shows water as white

Facial Pain Diagnosis

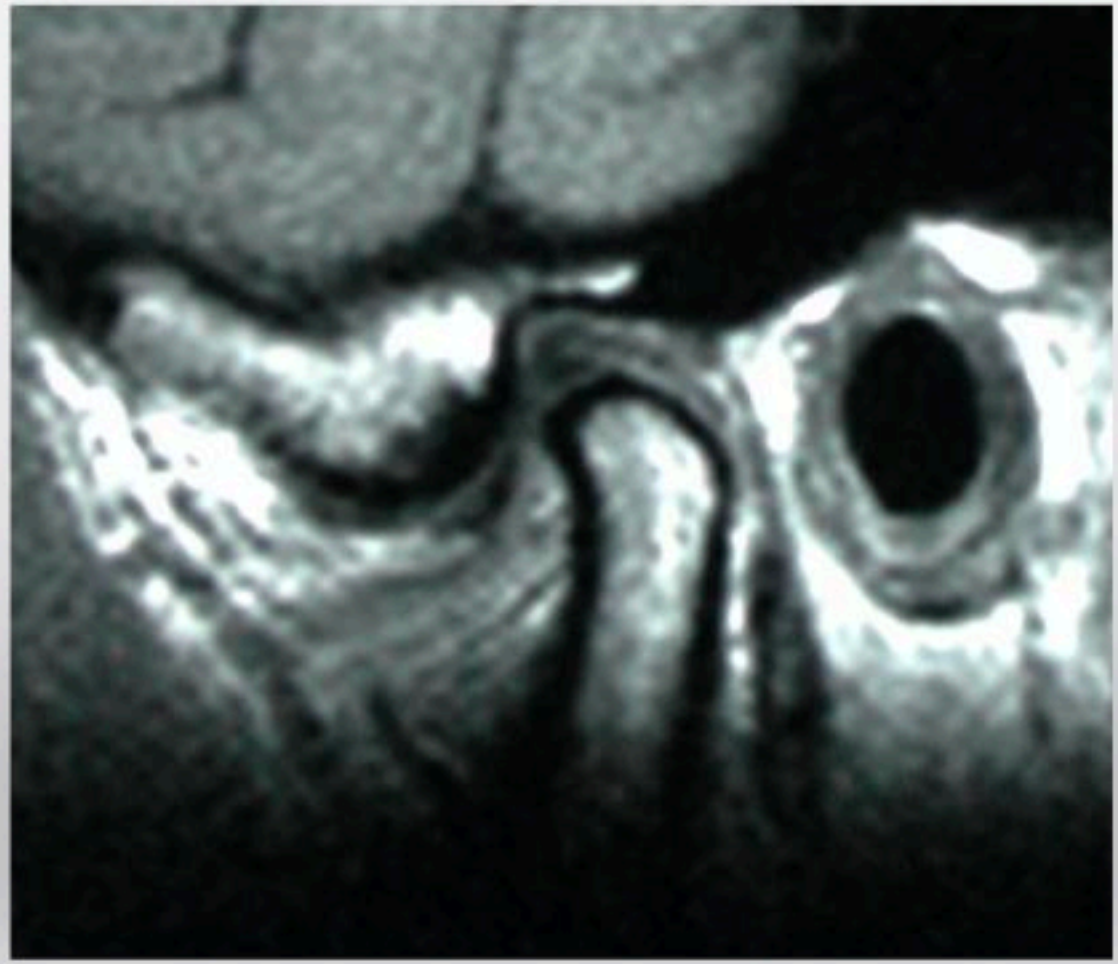
Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. Anterior Stop Test
5. Sleep Airway Screening
6. CT Scan

MRI

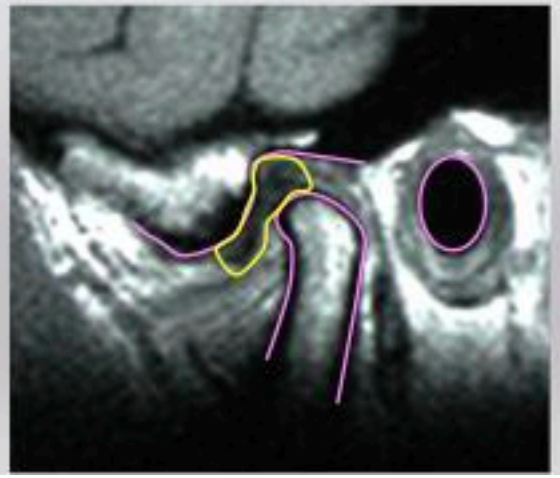
Blood Tests

Short



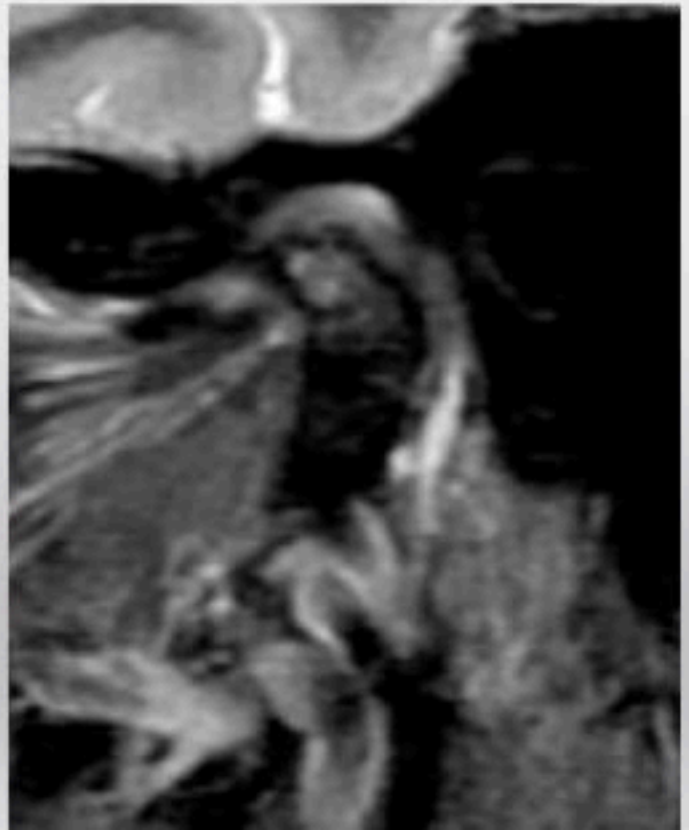
T1 Inverted

T1 Sagittal Closed



MRI STIR Image

STIR- Short T1 Inversion Recovery



STIR- "Supercharged" T2

Retrodiscal Inflammation

Marrow Edema

Diff Dx is active AVN, Osteoarthritis, Lyme Ds, RhA, Hypoxic Progressive Condylar Resorption, Other.

STIR and T2 shows water as white

CBCT Rx

Patient _____

Date _____

Dx Code:
Reason for Scan:

1. LargeField of View
15cm tall field of view or greater
At 12cm tall you will miss some joints. 15cm and up is better
Note: 17cm x12 cm is 12 cm tall. The smaller # is the height, and is listed last

2. Scan Area
Scan Area to include 1cm above condylar head,
1 cm behind condylar head and 1 cm below chin.

3. KVP and AMP
Use highest KVP and Amperage the machine allows to get best contrast.

4. Voxel Size
Lesser scan time minimizes movement artifact. 0.3 voxel will give a better image than 0.1 voxel

5. No Metal-
No hair ties/clips, facial piercings, partials, glasses, etc.

6. Natural Neck Posture
Side view: Neck in natural postural alignment, and Frankfurt horizontal plane parallel to the floor. Avoid reaching for chin-rest with head forward posture.
Align head frontal view: Laser aligner down middle of face, can see both ears equally

7. Hold Still, Back teeth together
Goal: Patient to hold very, very still for 20 seconds while scan is being taken
Sitting is more stable than standing. A hard chair works well.
Practice swallowing, back teeth touching, tongue lightly resting back of front teeth.
Practice lightly breathing.
Give patient a 7 second warning before you take the scan so they can swallow, get back teeth touching, and have tongue lightly resting back of front teeth.

8. Take Scan
Ten seconds before scan have patient swallowing, back teeth touching, tongue lightly resting back of front teeth, lightly breathing.

9. Burn Raw DICOM
Burn as Raw Dicom files, not locked into a viewer program

MRI Scan of the Temporomandibular Joint
1.5 Tesla Magnet

_____
date

Please evaluate: _____

Significant History: ☐ See Exam Form

☐ Facial Pain 784.0
☐ Avascular Necrosis 926.4
☐ Osteoarthritis 715.2

_____

_____

- Use TMJ coils. Use 1.5 Tesla magnet. Do not use an open MRI. Do not use a short flip angle.
- Show orientation views
- Closed views are with back teeth together.
- Use a roll of tape (3M Transpore Tape 1 inch wide) for the open view. The roll is two inches in diameter. Have patient open as wide as they can comfortably and place the tape roll as far back as possible with the flat side toward the teeth. They should be biting into the tape with their back molars on both sides.
- Copy DICOM images to a CD and give to patient.
- If at Anne Arundel Medical Center, Radiologist Kerry Thompson, MD is to read the scan.

☐ Patient has wax index to wear on teeth to stabilize jaw for closed view.
☐ Patient is to wear Dr. Droter's appliance for all closed views.
☐ Gave Rx for _____. They will take it 1 hour before scan.
☐ Patient to get braces off molars before scan. No orthodontic wire in place.

1. T1, mouth closed, corrected sagittal projection, right and left TMJ.
   8 or more views: lateral, medial, 4 cuts through condylar head.

2. T2 scan mouth closed, corrected sagittal projection, right and left TMJ.
   8 or more views: lateral, medial, 4 cuts through condylar head.

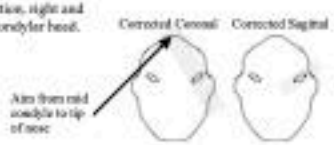
3. STIR (T1 inversion recovery) corrected sagittal projection, right and left TMJ.
   8 or more views: lateral, medial, 4 cuts through condylar head.

4. Proton Density, mouth closed, corrected sagittal projection, right and left TMJ.
   8 or more views: lateral, medial, 4 cuts through condylar head.

5. Proton Density, mouth closed, corrected coronal projection, right and left TMJ.
   8 or more views: in front of condylar head, through condylar head, behind condylar head.
   Be sure to go at least one slice distal, and one slice anterior to condylar head.

6. Proton Density, mouth open fully, corrected sagittal projection, right and left TMJ. 8 or more views: lateral, medial, 4 cuts through condylar head.
   Use roll of tape for open view as described above.
   Take this view last.

Thank You



Facial Pain Diagnosis

Diagnostic Tools

1. Written and Oral History
2. Observation
3. Physical Exam
   - Muscle Palpation
   - Joint Palpation
   - Joint Auscultation
   - Joint Motion
4. Anterior Stop Test
5. Sleep Airway Screening
6. CT Scan
   MRI
   Blood Tests

Date- _____ Blood, Urine Tests

John R. Droter, DDS
4000 Mitchellville Rd,
B330 ,
Bowie MD, 20716
301-805-9400
fax 888-445-1132
NPI 1982554147

Patient- _____

Dx Codes: ❑ R53.83 Fatigue ❑ J98.9 Upper Airway Resistance

✔ CBC w/ Diff Complete Blood Count with white cell differential
___ Retic Count Reticulocyte Count

✔ CMP Fasting Complete Metabolic Panel, Chem 14, Fasting Glucose
___ Phosphorus, Serum
___ Calcium, Serum
___ Urinalysis w/ Reflex to Culture

✔ HbA1C Hemoglobin A1c, Glycated hemoglobin
___ Fasting Insulin

✔ Total Iron, Serum
✔ TIBC Total Iron-Binding Capacity
✔ Ferritin, Serum
✔ % Transferrin Saturation

✔ Vitamin D, 25(OH) and 1,25 Dihydroxy (LC/MS technique)
✔ Vitamin B12
✔ Homocysteine
✔ Methylmalonic Acid
___ Uric Acid, Serum
___ Vitamin A
___ Selenium (RBC)
___ Zinc (RBC)
___ Magnesium (RBC)

✔ hs-CRP High Sensitivity C-Reactive Protein
✔ ESR, Westergren Erythrocyte Sedimentation Rate, Westergren

✔ TSH Thyroid Stimulating Hormone
___ FT4 Free T4
___ FT3 Free T3
___ RT3 Reverse T3
___ TPO Antibodies Thyroid Peroxidase Antibodies
___ Thyroglobulin Antibodies

✔ Basic Lipid Panel
___ LDH Lactic Acid DeHydrogenase
___ Lipoprotein Subfractionation Panel
___ Cardio IQ Lipoprotein Fractionation

___ F2 Isoprostanes Urine Test
___ MARC Urine Micro Albumin/ Creatine Urine Ratio
___ Fibrinogen
___ Lp-PLA2 Lipoprotein-Associated Phospholipase A-2
___ MPO Myeloperoxidase

___ ANA, IFA w/ Reflex ot Titer and Pattern
___ Lyme Western Blot

This blood test requires fasting- other than water, no food or drink for 10 hours. Water is OK and recommended. Stay hydrated.

_____ _____
John R Droter, DDS date

v16.10

Age 16F
cc: Facial Pain, Excessive Daytime Fatigue

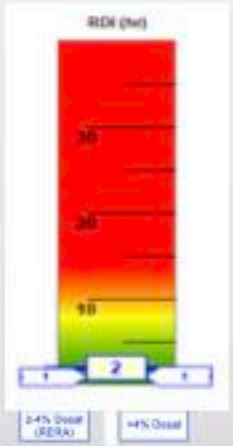
Differential Diagnosis:
Diseases to consider and rule out:

Age 16F
cc: Facial Pain, Excessive Daytime Fatigue

Medical Sleep Study in Lab RDI = 1
Dx: Snoring without evidence of gas exchange abnormalities or sleep disruptions

Sleep Latency Test
Dx: Narcolepsy
Recommend daytime medication

Patient Safety Inc Pulse Ox Sleep Screening
RDI = 2, Autonomic Arousals 31 /h



PULSE RATE DATA

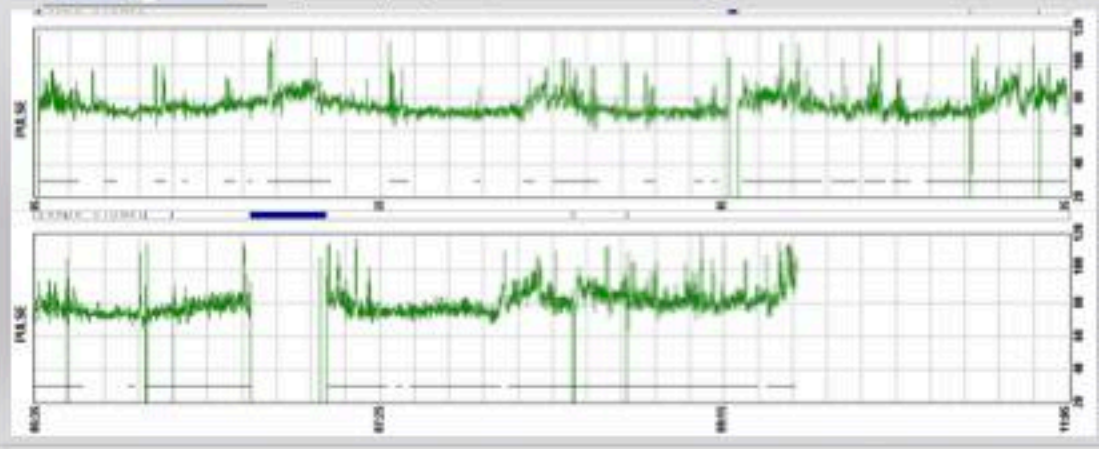
Autonomic Arousals
Index (#/hr): 31

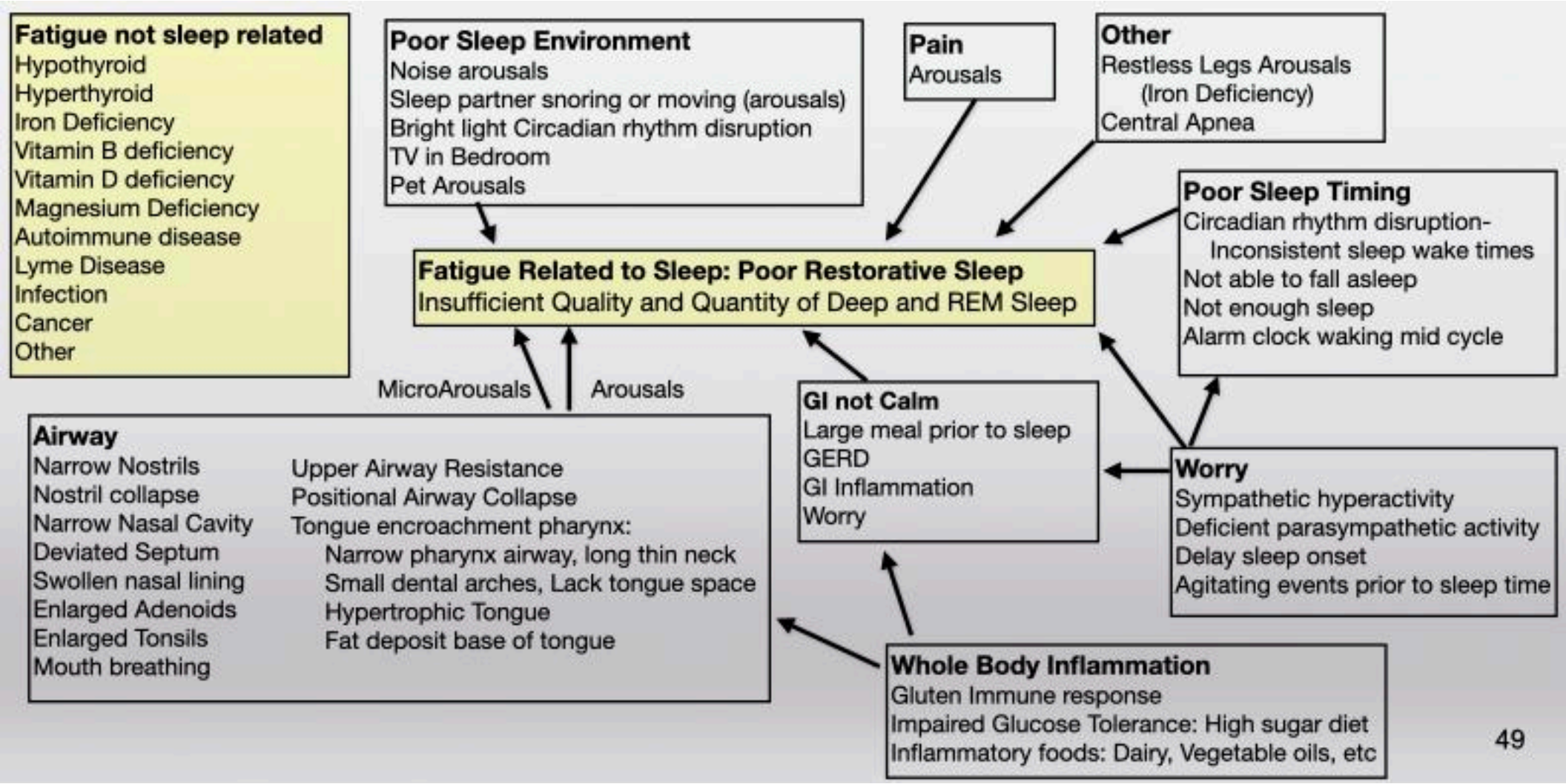
Pulse Rate Range
Mean: 78
Min: 34
Max: 122

Tachycardia - Sleep (>90 bpm)
Duration: 00:34:56
% (VRT): 6%

Bradycardia - Sleep (<50 bpm)
Duration: 00:00:35
% (VRT): 0%

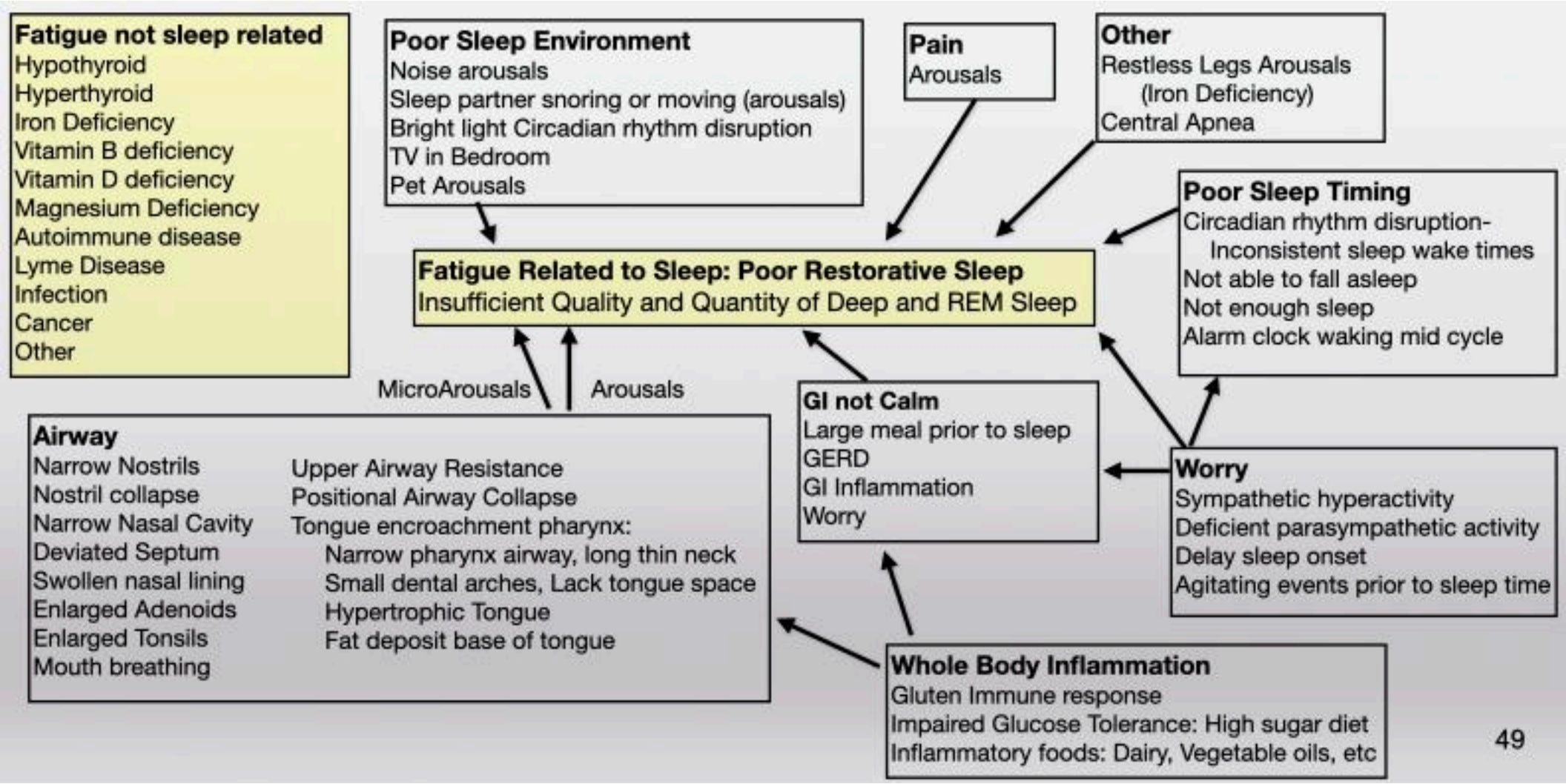
Heart Rate
>90 bpm
for 35 min



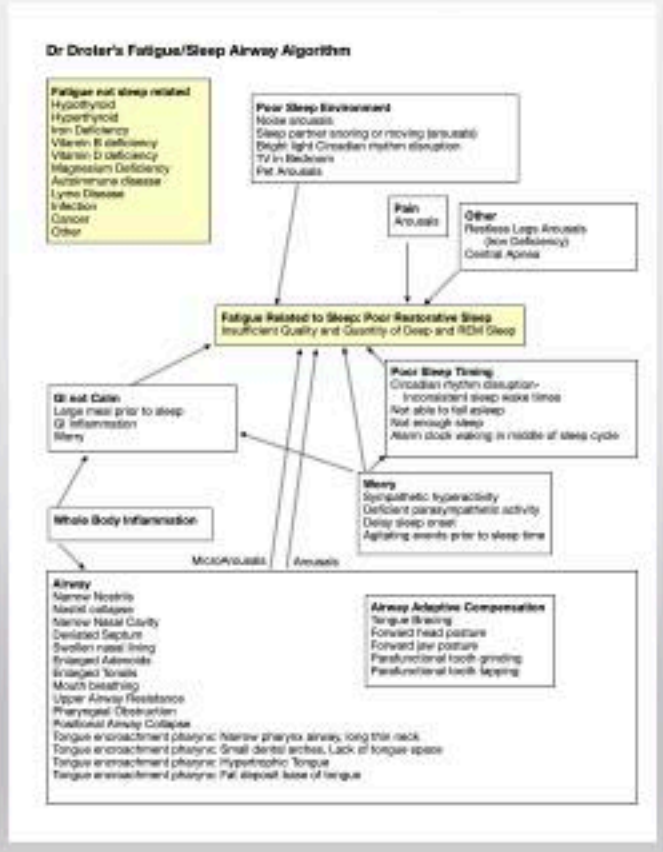

Fatigue not sleep related
Hypothyroid
Hyperthyroid
Iron Deficiency
Vitamin B deficiency
Vitamin D deficiency
Magnesium Deficiency
Autoimmune disease
Lyme Disease
Infection
Cancer
Other
Poor Sleep Environment
Noise arousals
Sleep partner snoring or moving (arousals)
Bright light Circadian rhythm disruption
TV in Bedroom
Pet Arousals
Pain
Arousals
Other
Restless Legs Arousals
(Iron Deficiency)
Central Apnea
Poor Sleep Timing
Circadian rhythm disruption-
Inconsistent sleep wake times
Not able to fall asleep
Not enough sleep
Alarm clock waking mid cycle
Fatigue Related to Sleep: Poor Restorative Sleep
Insufficient Quality and Quantity of Deep and REM Sleep
MicroArousals
Arousals
GI not Calm
Large meal prior to sleep
GERD
GI Inflammation
Worry
Worry
Sympathetic hyperactivity
Deficient parasympathetic activity
Delay sleep onset
Agitating events prior to sleep time
Airway
Narrow Nostrils
Nostril collapse
Narrow Nasal Cavity
Deviated Septum
Swollen nasal lining
Enlarged Adenoids
Enlarged Tonsils
Mouth breathing
Upper Airway Resistance
Positional Airway Collapse
Tongue encroachment pharynx:
Narrow pharynx airway, long thin neck
Small dental arches, Lack tongue space
Hypertrophic Tongue
Fat deposit base of tongue
Whole Body Inflammation
Gluten Immune response
Impaired Glucose Tolerance: High sugar diet
Inflammatory foods: Dairy, Vegetable oils, etc

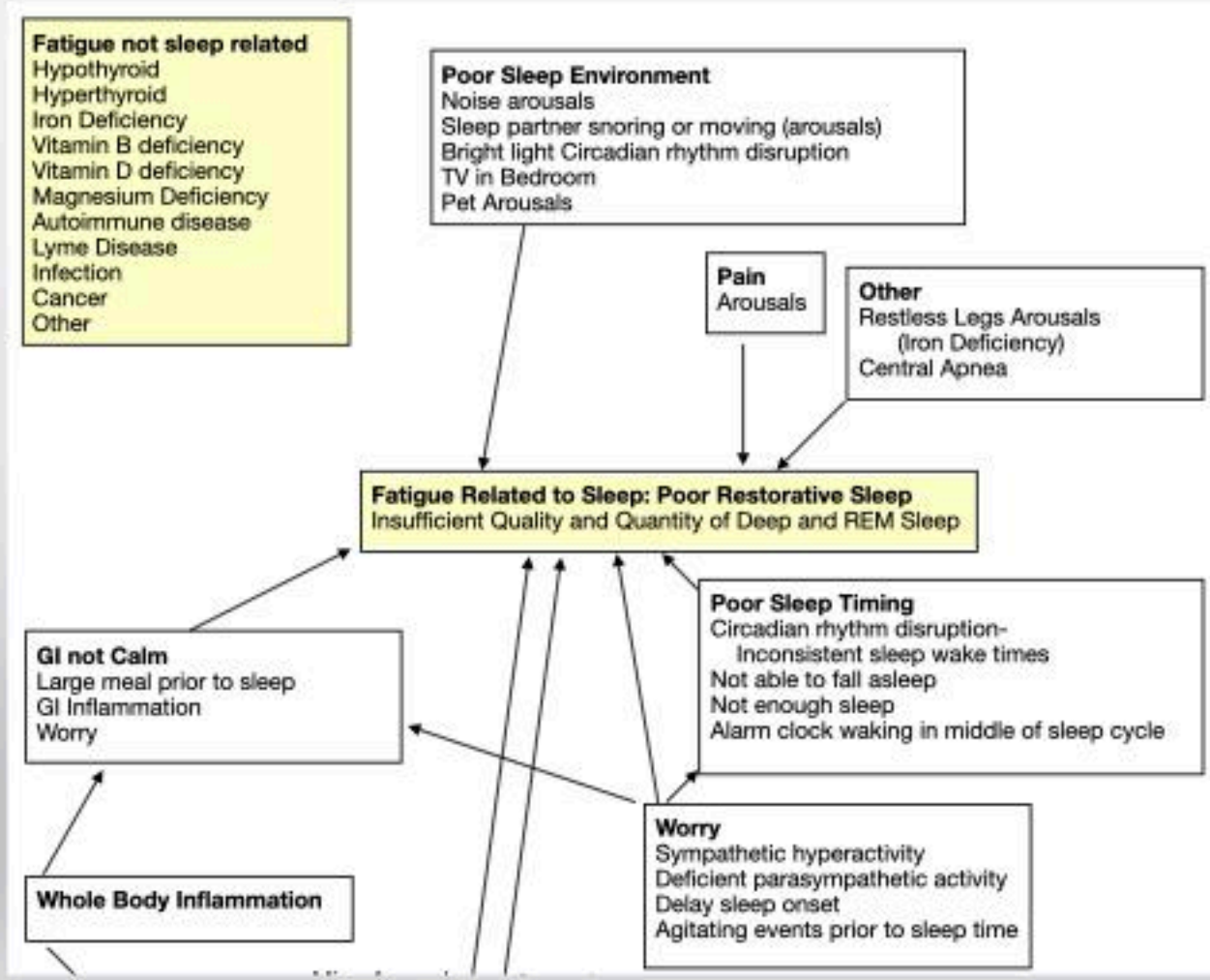
Fatigue

John R Droter DDS
Annapolis, Maryland

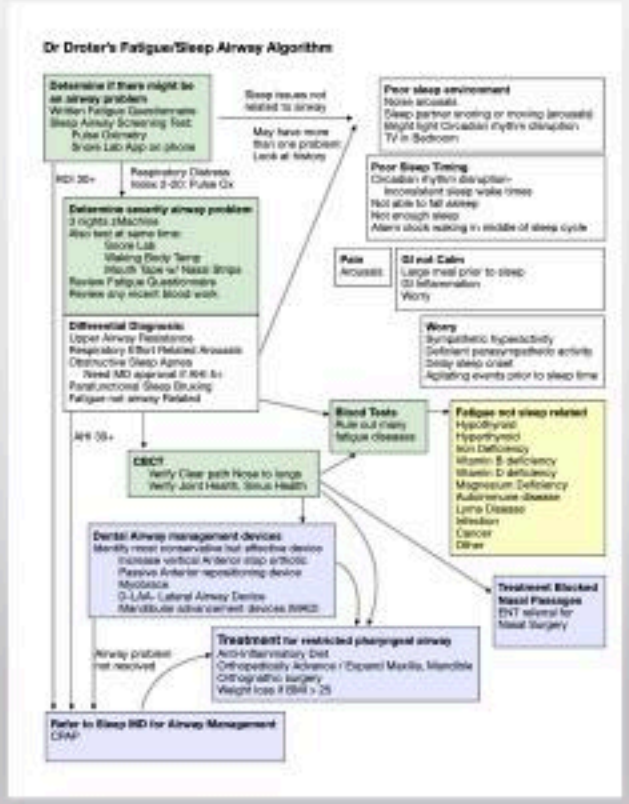

Fatigue not sleep related
Hypothyroid
Hyperthyroid
Iron Deficiency
Vitamin B deficiency
Vitamin D deficiency
Magnesium Deficiency
Autoimmune disease
Lyme Disease
Infection
Cancer
Other
Poor Sleep Environment
Noise arousals
Sleep partner snoring or moving (arousals)
Bright light Circadian rhythm disruption
TV in Bedroom
Pet Arousals
Pain
Arousals
Other
Restless Legs Arousals
(Iron Deficiency)
Central Apnea
Poor Sleep Timing
Circadian rhythm disruption-
Inconsistent sleep wake times
Not able to fall asleep
Not enough sleep
Alarm clock waking mid cycle
Fatigue Related to Sleep: Poor Restorative Sleep
Insufficient Quality and Quantity of Deep and REM Sleep
MicroArousals
Arousals
GI not Calm
Large meal prior to sleep
GERD
GI Inflammation
Worry
Worry
Sympathetic hyperactivity
Deficient parasympathetic activity
Delay sleep onset
Agitating events prior to sleep time
Airway
Narrow Nostrils
Nostril collapse
Narrow Nasal Cavity
Deviated Septum
Swollen nasal lining
Enlarged Adenoids
Enlarged Tonsils
Mouth breathing
Upper Airway Resistance
Positional Airway Collapse
Tongue encroachment pharynx:
Narrow pharynx airway, long thin neck
Small dental arches, Lack tongue space
Hypertrophic Tongue
Fat deposit base of tongue
Whole Body Inflammation
Gluten Immune response
Impaired Glucose Tolerance: High sugar diet
Inflammatory foods: Dairy, Vegetable oils, etc

The many causes of Fatigue





The many causes of Fatigue



Determine if there might be an airway problem
Written Fatigue Questionnaire
Sleep Airway Screening Test:
Pulse Oximetry
Snore Lab App on phone

Sleep issues not related to airway

May have more than one problem: Look at history

Poor sleep environment
Noise arousals
Sleep partner snoring or moving (arousals)
Bright light Circadian rhythm disruption
TV in Bedroom

RDI 30+

Respiratory Distress Index 2-20: Pulse Ox

Poor Sleep Timing
Circadian rhythm disruption-
Inconsistent sleep wake times
Not able to fall asleep
Not enough sleep
Alarm clock waking in middle of sleep cycle

Determine severity airway problem
3 nights zMachine
Also test at same time:
Snore Lab
Waking Body Temp
Mouth Tape w/ Nasal Strips
Review Fatigue Questionnaire
Review any recent blood work

Pain
Arousals

GI not Calm
Large meal prior to sleep
GI Inflammation
Worry

Differential Diagnosis:
Upper Airway Resistance
Respiratory Effort Related Arousals
Obstructive Sleep Apnea
Need MD approval if AHI 5+
Parafunctional Sleep Bruxing
Fatigue not airway Related

Worry
Sympathetic hyperactivity
Deficient parasympathetic activity
Delay sleep onset
Agitating events prior to sleep time

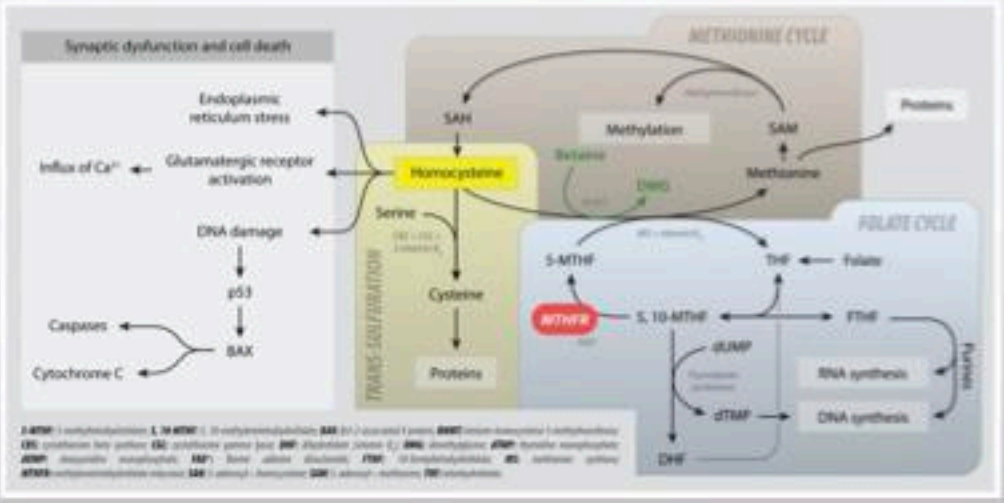
Blood Tests
Rule out many fatigue diseases

Fatigue not sleep related
Hypothyroid
Hyperthyroid
Iron Deficiency
Vitamin B deficiency
Vitamin D deficiency
Magnesium Deficiency
Autoimmune disease

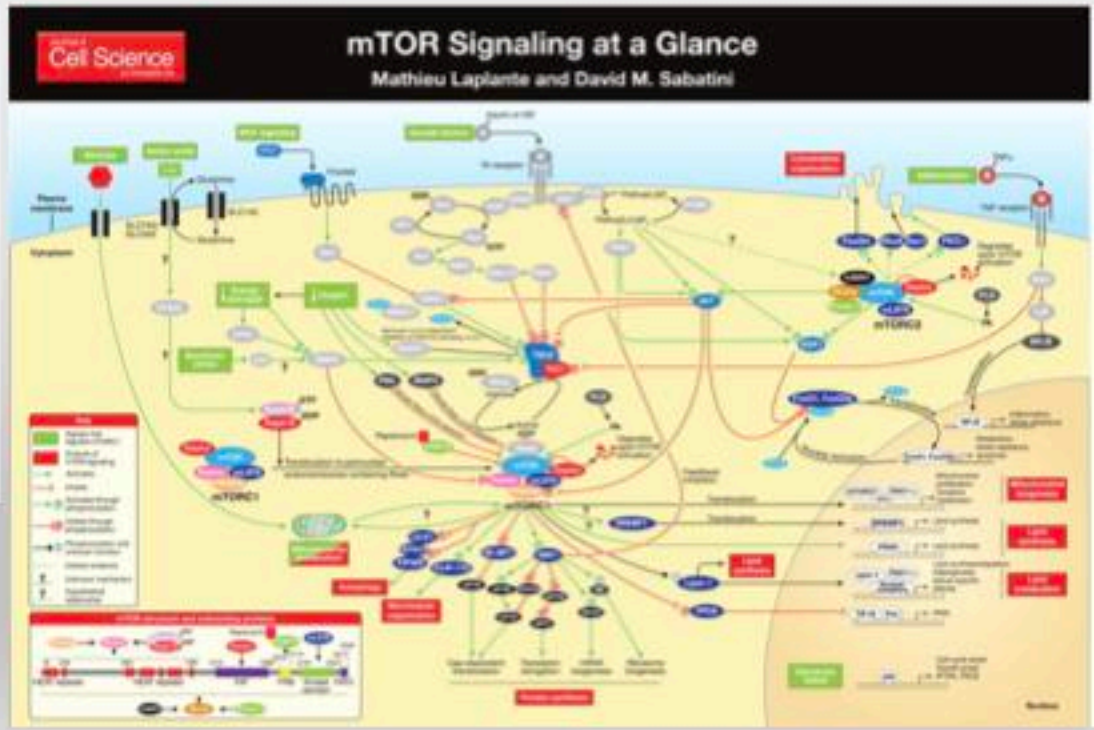
AHI 30+

CBCT
Verify Clear path Nose to lungs
Verify Joint Health, Sinus Health

Vitamin D deficiency
leads to Vitamin B deficiency
leads to high Homocysteine
leads to Inflammation (damages arteries)



Homocysteine activates mTORC1



Vit D needed to Absorb Vit B12 made in gut
Low Vit B = poor sleep, fatigue

Date- _____ Blood, Urine Tests

John R. Droter, DDS
4000 Mitchellville Rd,
B330 ,
Bowie MD. 20716
301-805-9400
fax 888-445-1132
NPI 1962554147

Patient- _____

Dx Codes: ❑ R53.83 Fatigue ❑ J98.9 Upper Airway Resistance

✔ CBC w/ Diff Complete Blood Count with white cell differential
___ Retic Count Reticulocyte Count

✔ CMP Fasting Complete Metabolic Panel, Chem 14, Fasting Glucose
___ Phosphorus, Serum
___ Calcium, Serum
___ Urinalysis w/ Reflex to Culture

This blood test requires fasting- no food or drink for 10 hours. Water is OK

✔ HbA1C Hemoglobin A1c, Glycated hemoglobin
___ Fasting Insulin

✔ Total Iron, Serum
✔ TIBC Total Iron-Binding Capacity
✔ Ferritin, Serum
✔ % Transferrin Saturation

✔ Vitamin D, 25(OH) and 1,25 Dihydroxy (LC/MS technique)
✔ Vitamin B12
✔ Homocysteine
✔ Methylmalonic Acid
___ Uric Acid, Serum
___ Vitamin A
___ Selenium (RBC)
___ Zinc (RBC)
___ Magnesium (RBC)

✔ hs-CRP High Sensitivity C-Reactive Protein
✔ ESR, Westergren Erythrocyte Sedimentation Rate, Westergren

✔ TSH Thyroid Stimulating Hormone
___ FT4 Free T4
___ FT3 Free T3
___ RT3 Reverse T3
___ TPO Antibodies Thyroid Peroxidase Antibodies
___ Thyroglobulin Antibodies

✔ Basic Lipid Panel
___ LDH Lactic Acid Dehydrogenase
___ Lipoprotein Subfractionation Panel
___ Cardio IQ Lipoprotein Fractionation

___ F2 Isoprostanes Urine Test
___ MARC Urine Micro Albumin/ Creatine Urine Ratio
___ Fibrinogen
___ Lp-PLA2 Lipoprotein-Associated Phospholipase A-2
___ MPO Myeloperoxidase

___ ANA, IFA w/ Reflex ot Titer and Pattern
___ Lyme Western Blot

_____ _____
John R Droter, DDS date

Date- _____

Blood, Urine Tests

John R. Droter, DDS
4000 Mitchellville Rd,
B330 ,
Bowie MD, 20716
301-805-9400
fax 888-445-1132
NPI 1962554147

Patient- _____

Dx Codes: ❑ R53.83 Fatigue ❑ J98.9 Upper Airway Resistance

.....

✔ CBC w/ Diff Complete Blood Count with white cell differential
___ Retic Count Reticulocyte Count

✔ CMP Fasting Complete Metabolic Panel, Chem 14, Fasting Glucose
___ Phosphorus, Serum
___ Calcium, Serum
___ Urinalysis w/ Reflex to Culture

✔ HbA1C Hemoglobin A1c, Glycated hemoglobin
___ Fasting Insulin

✔ Total Iron, Serum
✔ TIBC Total Iron-Binding Capacity
✔ Ferritin, Serum
✔ % Transferrin Saturation

✔ Vitamin D, 25(OH) and 1,25 Dihydroxy (LC/MS technique)
✔ Vitamin B12
✔ Homocysteine
✔ Methylmalonic Acid
___ Uric Acid, Serum
___ Vitamin A
___ Selenium (RBC)
___ Zinc (RBC)
___ Magnesium (RBC)

This blood test requires fasting- no food or drink for 10 hours. Water is OK

✔ hs-CRP High Sensitivity C-Reactive Protein
✔ ESR, Westergren Erythrocyte Sedimentation Rate, Westergren

✔ TSH Thyroid Stimulating Hormone
____ FT4 Free T4
____ FT3 Free T3
____ RT3 Reverse T3
____ TPO Antibodies Thyroid Peroxidase Antibodies
____ Thyroglobulin Antibodies

✔ Basic Lipid Panel
____ LDH Lactic Acid DeHydrogenase
____ Lipoprotein Subfractionation Panel
____ Cardio IQ Lipoprotein Fractionation

____ F2 Isoprostanes Urine Test
____ MARC Urine Micro Albumin/ Creatine Urine Ratio
____ Fibrinogen
____ Lp-PLA2 Lipoprotein-Associated Phospholipase A-2
____ MPO Myeloperoxidase

____ ANA, IFA w/ Reflex ot Titer and Pattern
____ Lyme Western Blot

_____ _____
John R Droter, DDS date

v19.10

Which famous doctor published this?

A desire to take medicine separates man from animals. Why this appetite should have developed, how it could have grown to its present dimension, what it will ultimately reach, are interesting problems in psychology. We of the profession…..routinely administer nauseous mixtures on every possible occasion.

…..when we are able to say without fear of dismissal, that a little more exercise, a little less food, and a little less tobacco and alcohol may possible meet the indications of the case.

Sir William Osler, 1891

A desire to take medicine separates man from animals. Why this appetite should have developed, how it could have grown to its present dimension, what it will ultimately reach, are interesting problems in psychology. We of the profession…..routinely administer nauseous mixtures on every possible occasion.

…..when we are able to say without fear of dismissal, that a little more exercise, a little less food, and a little less tobacco and alcohol may possible meet the indications of the case.

"Recent Advances in Medicine," Science, March **1891**

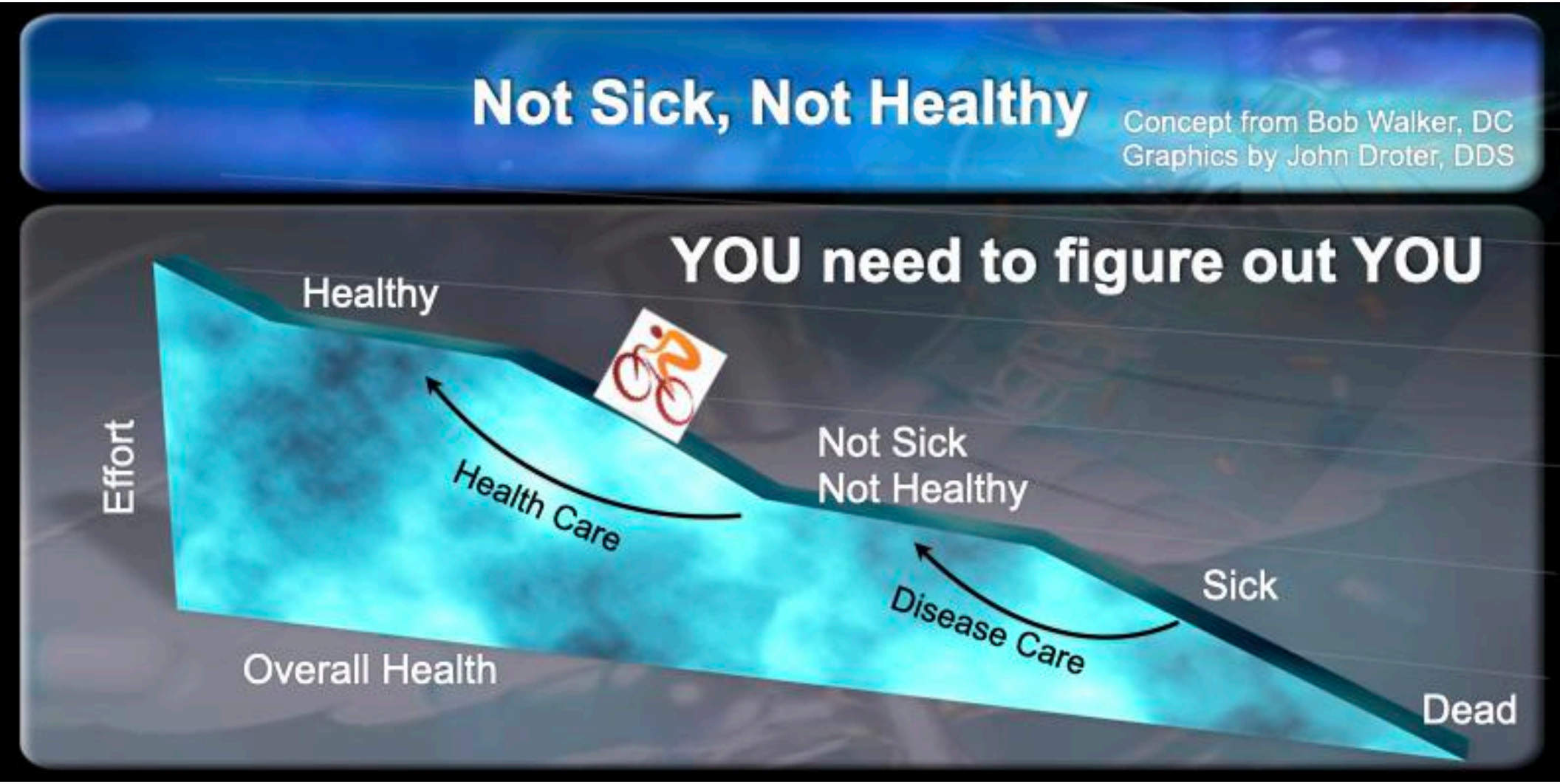
Founding father of Johns Hopkins Medical School
Father of modern medicine
"Greatest diagnostician ever to wield a stethoscope"

from book: William Osler, A life in Medicine. Michael Bliss


TOXIC PILLS
AND SURGERY
LIFESTYLE
CHANGE

Not Sick, Not Healthy

Concept from Bob Walker, DC
Graphics by John Droter, DDS



Facial Pain Diagnosis

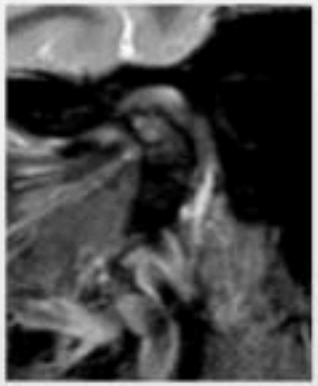
Diagnostic Tools

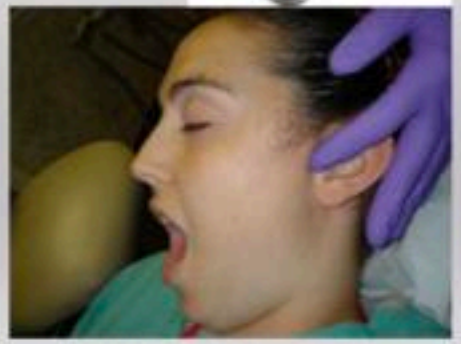
1 Written and Oral History
2 Observation
3 Physical Exam
- Muscle Palpation
- Joint Palpation
- Joint Auscultation
- Joint Motion

4 Anterior Stop Test
5 Sleep Airway Screening
6 CT Scan
- MRI
- Blood Tests

Occlusion: CR Mounted Study Models
Complete Dental Exam
Clinical Photographs
Dx Blocks
Dx Orthotics- Brux Checker, CR Orthotic

<u>Biometrics</u>
Joint Vibration
Jaw Tracker
Electromyography
T-Scan





Diagnostic Boxes:
Diagnosis is Pattern Recognition

Other

What is sore?

What is dysfunctional?

Does this fit any diagnostic patterns I recognize?

The Diagnostic Process

When diagnosing and treating facial pain,
we have entered the world of medicine.

Think!!

Differential Diagnosis
All the choices

Diagnostic tests (Observations)
Narrow down the choices

Working Diagnosis
Treating as if

Not completely resolved

Final Diagnosis
Only after problem resolved

Always make a differential diagnostic list
Ask, " It appears to be this, but what else could it be?
Be aware you are blinded by your beliefs

Treating Common TMDs

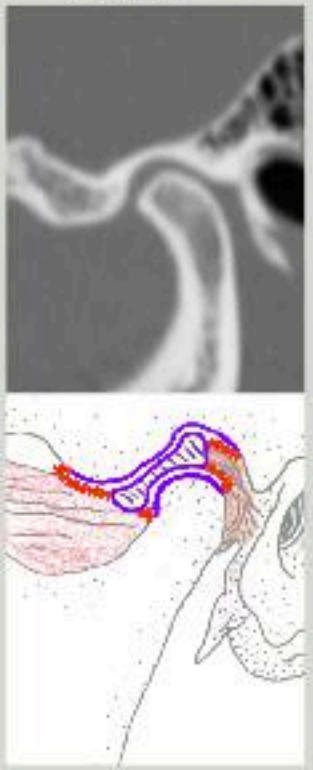
Diagnosis	Pattern	Treatment
Sleep Clenching with anterior tooth contact inhibition	Sore masseters on waking Morning TMJ clicking that resolves Sleep D-PAS Relieves Symptoms	D-PAS Night Guard Time Release Vitamin C hs
Sleep Grinding , Airway Related	Worn Teeth Upper Airway Resistance	Mandibular Advancement Appliance
Occlusal Muscle Disharmony	Sore muscles when chewing Sore Lateral Pterygoid, Headaches Day D-PAS Relieves Symptoms	Occlusal Adjustment
Osteoarthritis of TMJ	Arthralgia CBCT shows worn bone loss MRI T2, STIR ++	NSAID for 6-12 weeks Occlusal Adjustment Do not put in a night guard
Sprain Discal Ligament TMJ, Acute	Sudden onset pain TMJ Pain palpation TMJ Limited opening	Cold Laser, Ice 15 min 3x a day Rest, Soft diet, NSAID 7 days Anterior Reposition Orthotic 7 days
Hypoxia Induced Progressive Condylar Resorption	Progressive anterior open bite Missing condylar cortex on CT	Condylar distraction for 6 months Meloxicam, Doxycycline


Know Yourself
Know Your Work
Know Your Patient
Apply Your Knowledge
LD Pankey Institute
Write your Dream

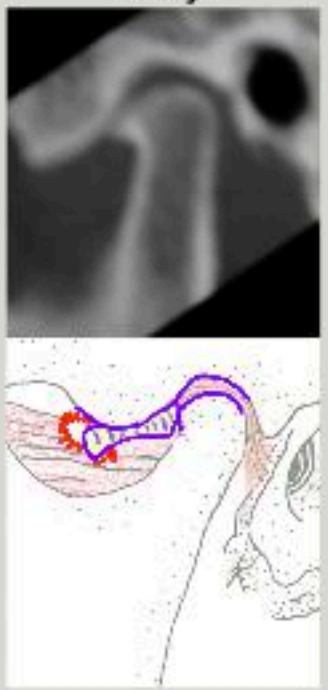
Osteoarthrosis/Osteoarthritis

Healthy joints have no friction or wear.
Damaged joints have Friction. Friction causes wear.
OA is a wearing out of a joint which starts in cartilage.
Parafunction increases wear.

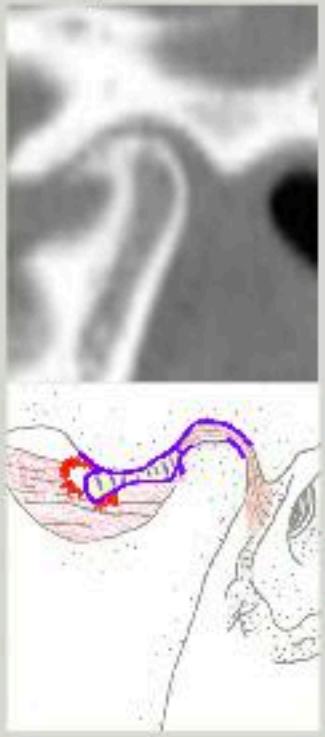
Normal



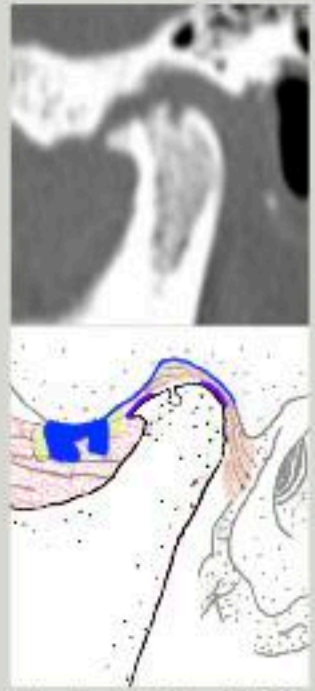
Early



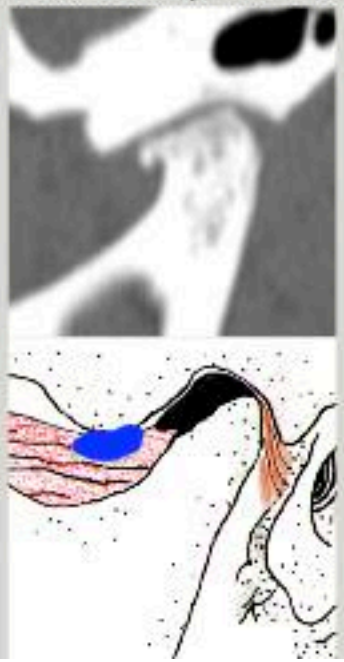
Early/ Moderate



Moderate



Severe OA, Eburnation



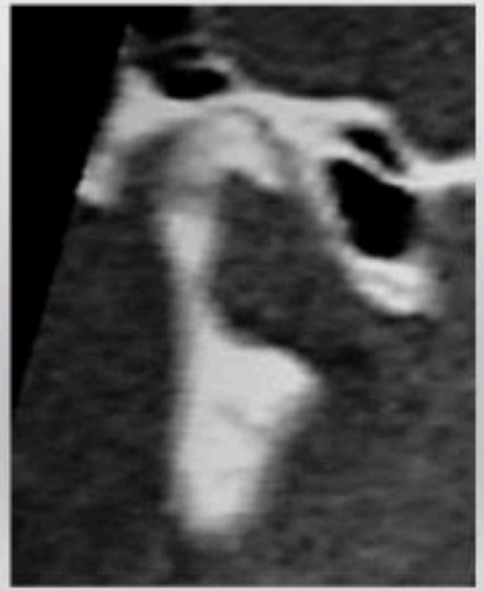
Representative examples of OA
in different patients

Drawings by Gretta Tomb DDS and John Droter DDS

Adaptation Chronic Bilateral Osteoarthrosis

Mandible recedes Slowly
Teeth Move/ Adapt
Anterior Guidance gets steeper as Condylar Guidance get shallower

OA Right and Left Bone Loss
#8 Ankylosed




Know Yourself
Know Your Work
Know Your Patient
Apply Your Knowledge
LD Pankey Institute
Write your Dream